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apc

#553
XMAS 2025

YOUR EXPERT GUIDE
TO TODAY'S TECH

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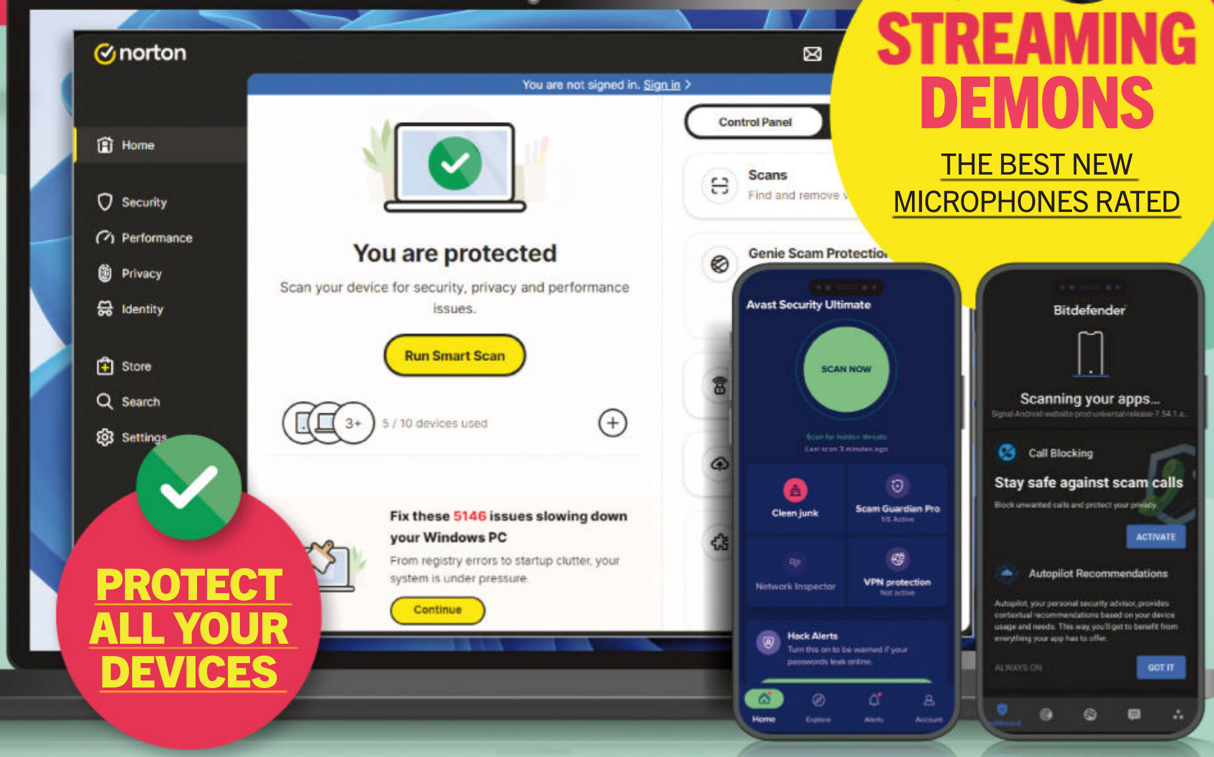
VALVE STUNS WITH NEW GAMING HARDWARE

THE $170 OFFICE PC

CAN A RASPBERRY PI REPLACE YOUR COMPUTER?

STREAMING DEMONS

THE BEST NEW MICROPHONES RATED



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Scan your device for security, privacy and performance issues.

Run Smart Scan

5 / 10 devices used

Fix these 5146 issues slowing down your Windows PC

From registry errors to startup clutter, your system is under pressure.

Continue

Control Panel

Scans

Genie Scam Protection

Avast Security Ultimate

SCAN NOW

Clean junk
Scam Guardian Pro
Network Inspector
VPN protection

Hack Alerts

Turn this on to be warned if your passwords leak online.

Bitdefender

Scanning your apps...

Call Blocking

Stay safe against scam calls

Block unwanted calls and protect your privacy.

ACTIVATE

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- ONE CLEAR WINNER
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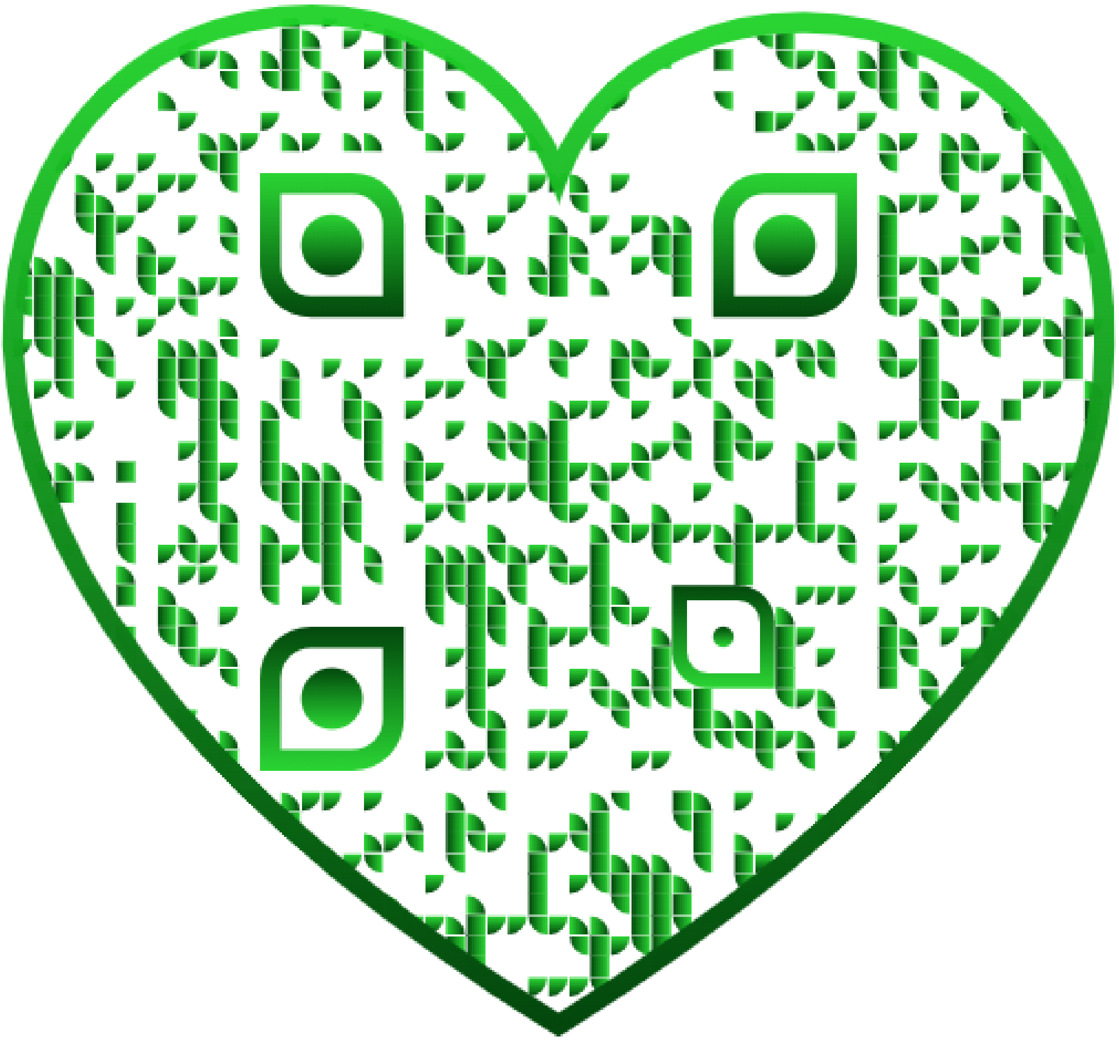
UPGRADE

CHOOSING THE PERFECT NEW PHONE

APPLE & GOOGLE'S BEST TESTED

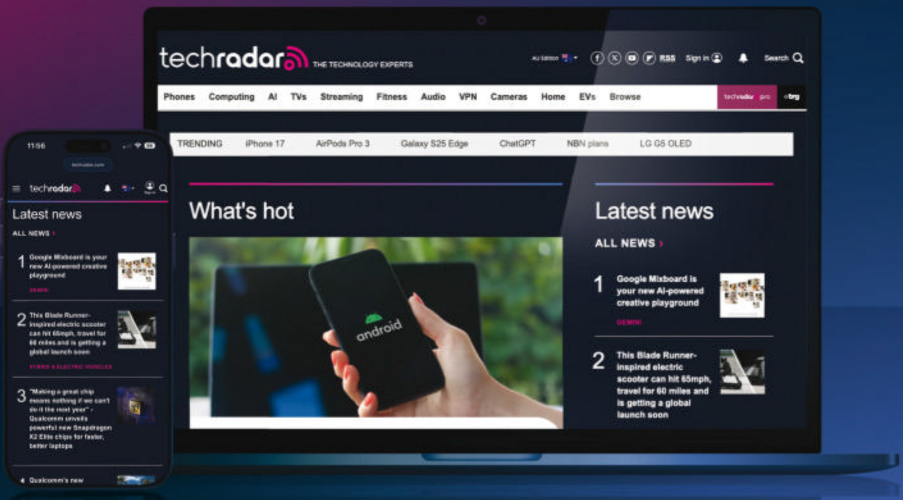
GEAR

WHICH WATCH IS THE BEST FOR YOUR LIFE?



Product testing for the real world

You need to know that the device or service you're about to spend money on works as advertised - and that it works in the real world.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Memories of cheap memory

Damn you, AI…

Oh my. Just when we thought prices for PC-related things had stabilised, and we could look to maybe treating ourselves to an upgrade, or jump into the end of year sales like Black Friday and Cyber Monday and pick up good bits on the cheap, it all goes pear-shaped again. Welcome to the Great Memory Apocalypse.

Get used to it, it'll be with us for some time. Mark's done a top job of summarising the mess in his column on page 14. In short – it's all AI's fault because AI datacentres are coming for our RAM. Consumer production across the world has been switched to providing datacentres with memory, and in numbers that have stripped the consumer market of stock, and sent prices on an explosive upward trajectory. Great!

In Blueprints (page 84), being the *APC* pages where we quote component prices, I updated them at the last possible moment – the day we sent to print. Suffice to say, things are moving so quickly that in the two weeks that will pass between me writing this, and you reading it, memory prices will have increased further…

Also, as I write this the Black Friday sale is on, and the only memory I can find is generally the stuff nobody wants. Slow frequencies, small capacities and poor timings, because all the good stuff has already been snapped up. Pre-built PC prices have already shot up by a couple of hundred dollars, and they'll keep going up. Fantastic! I feel for anyone that needs to buy memory, and I feel the pain of system builders and resellers who must unavoidably bump up their prices, as well as battle in the channel for the memory to build them in the first place.

Anyway. I need to apologise for a stuff up last issue. I did a review of the Powerbeats Fit earbuds and canned them with a 2.5/5 score, complaining that the sound was weak and tinny. Well, I stuffed up. The sound is actually fat and beefy, I'd just been using a tip size that I thought sealed well into my ears, but apparently didn't. After the *APC* review went to print I read another review where there was no such issue, so I tried again but with the biggest tips, the ones I rejected earlier because they only barely fitted in my ears and fell out easily. But the fat sound was there. Sorry Beats! Sorry anyone that wanted to buy these but were put off by my review! They're good now! ■

HOT TAKES

"This is shaping up to be about as severe as the silicon shortage during COVID and could last potentially longer."
System News, page 14

"I'm getting tired of seeing IT products that promise the earth and then leave me with a dejected sigh of disappointment."
One More Thing, page 15

"I've become a Linux Mint fanboy since installing it on a pensionable iMac in our kitchen."
Could this $170 Pi run your office? Page 46

"The combination of dramatic clouds, rolling hills, burning braziers and gently lilting wheat fields is enough to relax all the muscles in your neck that stiffen during a day of living life in 2025."
Anno 117: Pax Romana review, page 112

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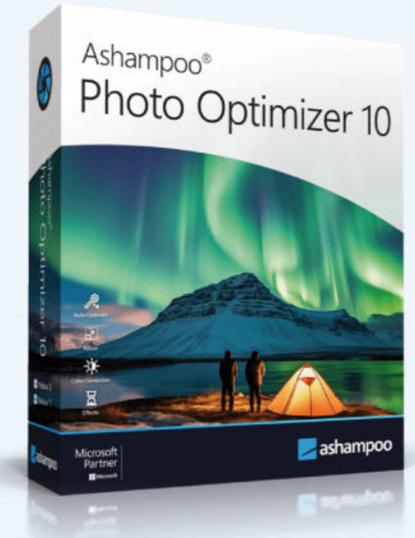

ASHAMPOO PHOTO OPTIMIZER 10

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Photos constitute irreplaceable memories and capture special moments in our lives. But they do not always come out as expected, or leave room for improvement. Ashampoo Photo Optimizer 10 helps you to make the most of your photos in a single click and achieve stunning results almost instantly and automatically—even with handy batch processing!

Ashampoo Photo Optimizer is well-know for its ability to quickly enhance and edit any number of images almost fully automatically. Version 10 takes it one step further: New lookup table (LUT) support opens the door to thousands of artistic effects that modify colour, saturation, and brightness values at the click of a button to create stunning atmospheres from cold and factual to warm and colourful.

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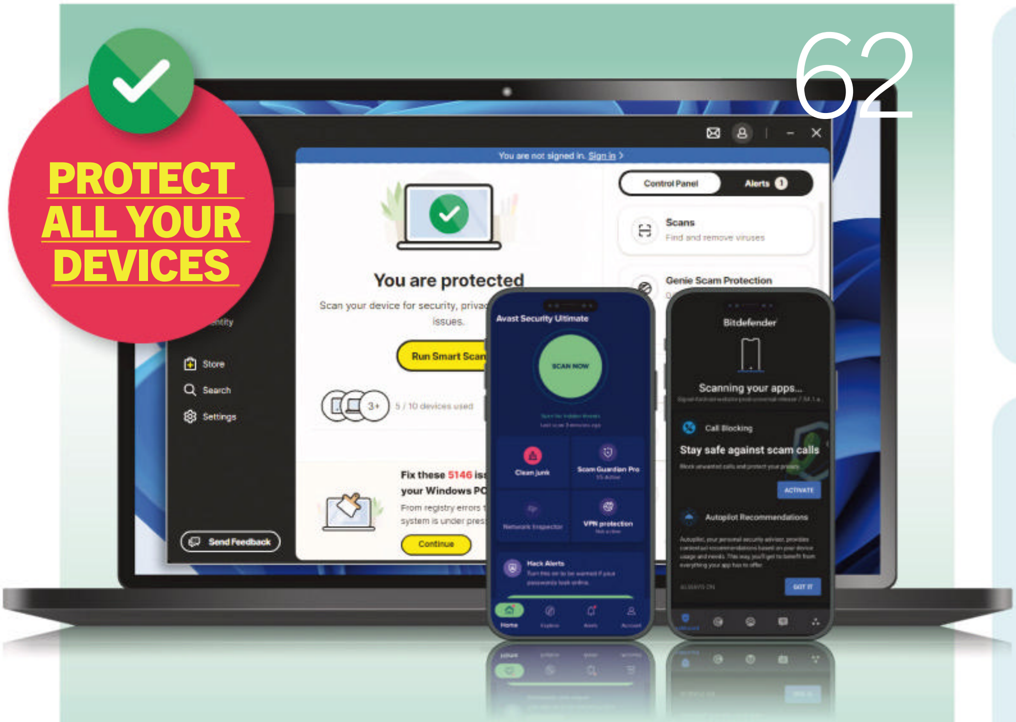
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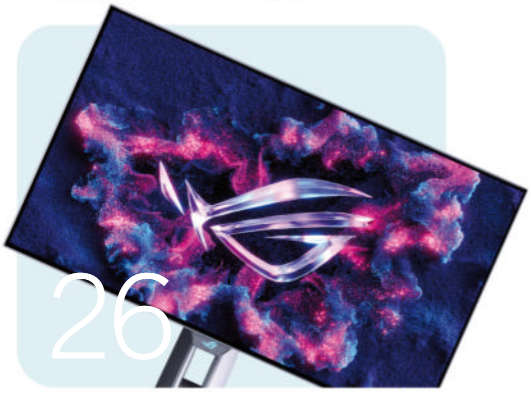

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TECHNOTES

Everything you need to know from the month in tech

Getty

HARD DRIVES ON BACKORDER FOR TWO YEARS

AI data centres trigger HDD shortage.

The race to achieve AGI (artificial general intelligence) has pushed constituents to invest in and build data centres at a pace far outstripping our ability to make them. The DRAM shortage is proof of this. Now storage is taking a hit, with delivery times for enterprise-grade HDDs currently delayed by two years.

That means if a firm wants to buy large-capacity hard drives, the backbone of nearline storage, it has to wait 24 months due to long lead times. As the news cycle suggests, AI money doesn't wait for anyone, so hyperscalers are now switching to QLC NAND-based SSDs to avoid these backorders. This could lead to consumer SSD prices rising worldwide, as most value-oriented models use QLC to save costs.

WINDOWS 11 IS GETTING A NEW POINT-IN-TIME RESTORE FEATURE

Recover a PC that's no longer able to boot, or data has become corrupted.

Microsoft has announced several new recovery tools and features coming to Windows 11 that are designed to help users bring a PC back to a working state in the event of catastrophic failure. The company is outlining a handful of new features that will help keep your PC operational, or make it easy to bring it back to operational even if an update or driver takes it offline.

It includes something called point-in-time restore, which will let users "rollback a PC to the exact state it was in an earlier point in time." Microsoft says this feature should help people recover from a wide range of issues, including problematic updates or drivers, and configuration errors.

Corsair

Manufacturers panic-buying RAM stocks

Massive demand for HBM and RDIMM for data centres driving shortage.

Major PC brands, system integrators and memory makers are now panic-buying memory chips and modules as the DRAM and NAND chip shortage is taking hold. Numerous companies are in a race to build up their stocks as data centres are swallowing up supply, leaving the consumer industry scrambling to get memory modules. Asus has said that its memory inventory for production and those that are already in finished products sit at two months. However, unless the situation changes, the company will start feeling the pinch of the shortage by 2026, requiring it to adjust its prices accordingly.

While most large companies like Asus and MSI typically have contracts with memory chip manufacturers, reports say that they're also now purchasing a lot of inventory in the spot market, where prices are more volatile, presumably to shore up their supply. This is a major change and could be a sign of things to come, as it usually only hosts low-volume purchases from smaller companies or when a major institution needs to acquire more memory modules due to unforeseen demand. These actions in the spot market are increasing pricing pressure, and it's already being felt by retail customers.

RAM prices have jumped by 100% or more recently, and some shops are limiting sales volume per customer because of limited deliveries, with some products remaining out of stock from distributors. Even memory kit makers are reportedly delaying the launch of new models due to the memory supply crunch, with products scheduled for launch in the last quarter of 2025 being moved to 2026.

The global infrastructure build-out of AI data centres is driving the massive demand for HBM and RDIMM, pushing out the supply for consumer memory and causing a "pricing apocalypse" that could last a decade. With companies investing billions of dollars in hardware, memory chipmakers are converting existing DRAM lines to take advantage of this lucrative market.

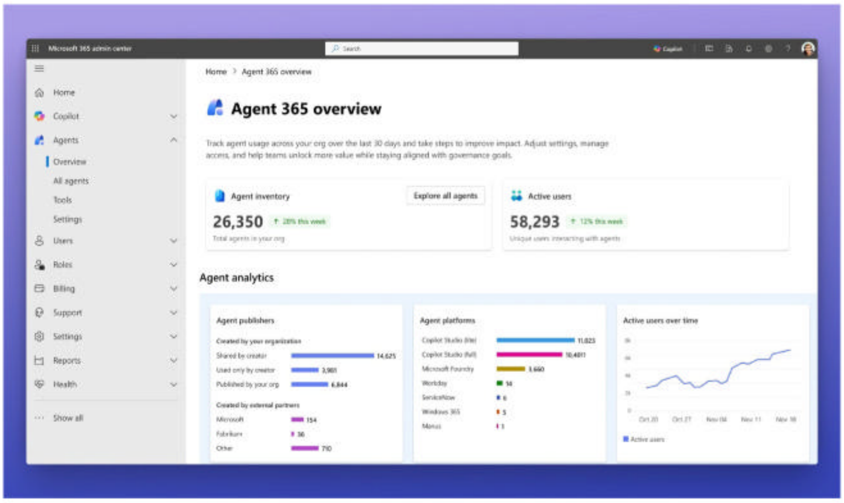
Unfortunately, they're also wary of market volatility, especially with some experts saying that we're in an AI bubble that can burst anytime. Because of this, most of them aren't willing to invest billions of dollars into additional facilities to increase RAM production.

Microsoft doubles down on agentic AI

Agent 365 prepares for a future with over one billion agents.

Microsoft announced Microsoft Agent 365 at its Ignite conference in November, with the goal of helping organisations manage and deploy agents. Agents are AI tools designed to automate specific tasks. Microsoft says people can "think of agents as the apps of the AI era." Agents can streamline tasks, perform repetitive actions and analyse data. Importantly, they can act across different environments.

Microsoft 365 Copilot will also feature dedicated Word, Excel, and PowerPoint agents. Agent Mode in Word, Excel, and PowerPoint will allow users to work interactively with Copilot. A similarly named Agent Mode in Copilot Chat will bring together web data and referenced files to help create content. Outlook has some agent features on the way as well. The Windows 11 Taskbar is about to get an agentic upgrade too, though the agentic nature of Windows has drawn criticism. A post on X by Microsoft's Windows lead Pavan Davuluri received so many negative responses that Davuluri disabled replies to his post. He later responded to the criticism and assured people that the Windows team is listening to feedback.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Active users
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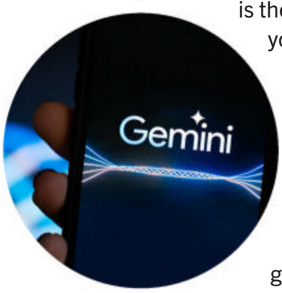
Microsoft

GEMINI 3 IS HERE

Google's newest AI model unlocks smarter answers and sharper tools.

Google has officially debuted Gemini 3, marking a major upgrade for its AI models and the platforms employing them. New reasoning modes, fresh app features, and an overhaul of the Google ecosystem that could change how people engage with Google products in day-to-day life.

Gemini 3 is changing how Google handles complex questions. For the first time, a Gemini model is available in Search immediately, and Google is routing the toughest queries to it. The most striking upgrade is the new generative UI. When you ask a complex question, Gemini 3 constructs a layout with visuals, tables, grids, and even custom-coded interactive simulations to go with the answer. For example, a question about loans generates a calculator tailored to the details you've included, and answers become more like small apps.



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MICROSOFT PROMISES A CLEANER, FASTER CONTEXT MENU

Cleaning up Windows 11's cluttered right-click menus.

Right-clicking in Windows 11 has been a sore spot since launch. The redesigned context menus promised a cleaner, modern look, but instead left users frustrated with hidden options, extra clicks, and inconsistent behaviour. Now, Microsoft is finally addressing the mess.

The upcoming changes aim to streamline the experience, reduce clutter, and restore the speed and familiarity that power users have been demanding.

These new menus are designed to nest functions and list options into sub-menus, which should clean up the main right-click context menu in apps. This will ultimately help reduce the size and number of items that immediately appear in the right-click menu, which can sometimes cause lagging or delays when trying to open the menu on slower systems.

Getty

'CHINA IS GOING TO WIN THE AI RACE'

Nvidia CEO Jensen Huang decries the price of electricity.

Nvidia CEO Jensen Huang says Washington has lost its edge in artificial intelligence and warns that China will win the AI race. He cited the West's cynicism, export controls, and favourable energy circumstances in China as the reason, claiming it is much easier for companies to access energy in the country. Recently, Microsoft also revealed it has GPUs it simply can't plug in because it doesn't have the energy required.

Referring to the U.S. ban on chip exports to China, Huang also argues that if China loses access to Nvidia's latest AI GPUs, its tech companies will be forced to purchase homegrown alternatives, which will pour money into its chip makers and further drive research, development, and innovations in the local semiconductor industry. ■

Valve

Full Steam ahead

Valve stuns the gaming world with the all-new Steam Machine and VR headset.

Valve rattled the gaming industry in 2022 with the launch of the Steam Deck, letting you take your PC games anywhere with an easy-to-use operating system. Now, the company is taking its learnings from that device and bringing them to your living room in a new gaming PC, the Steam Machine.

This is a system meant for living room play, armed with a new semi-custom AMD Zen 4 CPU and AMD RDNA 3 GPU, and it runs SteamOS just like the Steam Deck. In many ways, it's effectively a Steam-based console. Valve claims that this system is six times more powerful than the Steam Deck, though, so it should be a better couch experience than using the Steam Deck Dock and playing games at low resolution. The company suggests that the Steam Machine can play games in 4K and 60 frames per second, with the caveat that you'll have to rely on AMD's FSR upscaling.

The PC measures 162.4 x 156 x 152 mm – almost a cube. Most of the computer is on the bottom of the box, with the majority of the space inside taken up by a substantial heatsink and fan. The front of the system features a customisable light bar that you can personalise to indicate system status, such as when it is booting up, downloading games, or updating. There's also an e-ink front that displays system stats in real-time.

The Steam Machine's CPU is based on 6 AMD Zen 4 cores, runs up to 4.8GHz, and has a 30W TDP. The GPU uses AMD's RDNA 3 cores and features 28 compute units, 8GB of GDDR6 VRAM, and a 2.45GHz maximum sustained clock. The processor and GPU are two distinct chips on the same motherboard, which Valve says allows for the best-size device, along with the best thermal performance.

Valve will sell two configurations of the Steam Machine, and the only difference will be storage. You can get either a 512GB SSD or a 2TB SSD. Either way, Valve is using an M.2 2230 SSD in the system, though there is room to support an M.2 2280 if you decide to upgrade or replace the drive.

Just like on the Steam Deck, you can use a microSD card for additional storage. Valve also revealed that if you remove the card and place it in a Steam Deck or a Stream Frame, your library will come with you, ready to play in the other devices.

Valve also has a new controller – the Steam Controller. This will be sold in an optional bundle with the Steam Machine, as well as on its own. Beyond the Steam Machine, the Controller works with anything that runs Steam, including Windows, Mac and Linux PCs, PC gaming handhelds, the Steam Frame, and Steam Deck.

Valve hasn't provided pricing or an exact release date for the Steam Machine or Steam Controller just yet, though we were told to expect the hardware early next year. Some of that uncertainty is because of a volatile market for computer components.

"The market is kind of weird right now," a Valve rep told us. "Memory prices are going up right as we speak. There are a lot of things that we're still trying to figure it out. But our goal is to be ready, and we think we're doing a pretty good job of that."

Andrew E. Freeman ■

Steam Machine specs

CPU	AMD 6-core Zen 4 x86, up to 4.8GHz, 30W TDP
GPU	Semi-custom AMD RDNA3 28CU (8GB GDDR6, 2.45GHz max sustained clock, 110W TDP)
RAM	16GB DDR5 SO-DIMMs
Storage	512GB or 2TB models, microSD card slot
Power Supply	300W, internal
Dimensions (D x W x H)	162.4 x 156 x 152 mm
Ports	DisplayPort 1.4, HDMI 2.0, Ethernet (1Gbps), USB Type-C 3.2 Gen 2, 2x USB Type-A Gen 3 (front), 2x USB Type-A Gen 2 (rear)
Connectivity	Wi-Fi 6E, dedicated Bluetooth antennae, integrated 2.4 GHz Steam Controller radio
Controller	Steam Controller (optional bundle)
OS	SteamOS

The Steam Frame

Valve also announced a brand-new VR headset called the Steam Frame, and it's set to launch next year. Pricing is not yet confirmed, but it will launch in Australia on the same day as the U.S. and other countries. I've been to Valve HQ to try it out and get all the details. This isn't the Valve Index 2, it's something quite different, but it should still appeal to hardcore VR users and new users alike.

The Steam Frame includes a wireless adapter that plugs in via USB to a host PC, which can be any PC capable of running Steam and playing VR games. This wireless adapter beams the game over a dedicated 6GHz connection to the Steam Frame. Essentially, Valve intends for players to use the Steam Frame in the traditional sense of tethering to a gaming PC – just without the physical tether.

The Arm processor in the headset unlocks new capabilities, however. The Steam Frame is perfectly capable of running games all on its own. It uses clever software to play games developed for Windows and x86 on its Linux and Arm stack. It also natively supports games programmed for Arm, which many VR titles are designed for these days.

So, it supports a bit of everything: standalone, PCVR, Linux, Windows, Arm, x86... though a user shouldn't have to be conscious of many, if any, of these technical divisions. You put the Steam Frame on, choose a game from your Steam library, VR or not, and play. The software takes care of the translation from one operating system or architecture to another.

The Steam Frame uses a brand-new optics system and higher resolution LCD screens than the Valve Index. Following in the footsteps of other modern VR headsets, Valve is using pancake lenses to dramatically reduce the size of the optics and increase edge-to-edge sharpness.

The headset offers a clear, undistorted image from the centre to the furthest edges. These improvements to the eye box (the area of view that's comfortable and clear for a user) make a big difference to visual fidelity and clarity.

The Steam Frame is a diminutive device, much slimmer than the Valve Index. Glasses wearers can breathe a sigh of relief, as there's a spacer to extend the area behind the lenses to accommodate for glasses included in the box. Valve also told us it's investigating prescription inserts for those who prefer to have their headset ready to go without wearing anything else.

Valve intends for the Steam Frame to be modular. The core module, as Valve calls it, houses the processor, optics, cameras, and necessary cooling. This can be removed from the strap – it simply pops out. The strap contains the battery, speaker system, microSD card slot, and a USB 2.0 Type-C connector which lets you charge the device via an outlet or power bank as you play. By placing the battery on the rear of the device, it counteracts the weight of the core module and keeps the headset nicely balanced on your head.

Valve hasn't confirmed pricing for the Steam Frame, nor the exact release date. What we do know is the headset will launch sometime in 2026, alongside the Steam Machine and Steam Controller.

Jacob Ridley ■

Steam Frame specs

Resolution (per-eye)	2160 x 2160
Refresh rate (Hz)	72, 90, 120, 144 (experimental)
Optics	Pancake
IPD adjustment	Variable with dial
Field of view (horizontal)	Up to 110 degrees
SoC	Qualcomm Snapdragon 8 Gen 3 (SM8650)
RAM	16GB LPDDR5
Storage	256GB / 1 TB
Battery	21.6Wh
Speakers	Twin-driver (two per side) stereo speakers, integrated into strap
Connectivity	Wi-Fi 7 2x2
Controller	2x Steam Frame Controller
OS	SteamOS (Linux)
Weight	435g

Valve

From GPT to HBM — how the AI boom is causing the next tech crisis.

Mark Williams watches in horror as the Stargate opens, sucking the memory market through a wormhole.

Gamers can't get a break. Two crypto booms, a pandemic, and, recently, the AI boom have kept graphics card prices artificially high for well over eight years now. We're still riding out the tail end of the first AI boom that recently caused graphics card shortages and price hikes well over already inflated MSRP values. The graphics card market has settled down enough recently that most cards can be had at their original launch MSRP, sometimes lower.

The next economic disaster is heading consumers' way, and this time it could be much worse. Like many things profit-driven these days, it's due to AI.

At the start of the year, U.S. President Donald Trump helped announce a multinational AI joint venture between OpenAI, Oracle, SoftBank and MGX for a project dubbed 'Stargate'. Calling it "the largest AI infrastructure project in history". Aside from being named after arguably one of the greatest sci-fi franchises in history, the conglomerate plans to invest an astounding US$500 billion in building at least five data centres in the US, with sites also planned in the UAE, Argentina, Norway, and the UK.

Whilst there's no sign of GPU chip manufacturing being the bottleneck this time around, it's emerging that the next most crucial factor, memory, will be a significant issue.

Since Samsung, SK Hynix, and Micron produce the majority of the world's memory, their large pre-allocations for the Stargate project will drive up prices for other consumers. The memory market, forgive the pun, is volatile, so the three big producers, despite the influx of orders now, will be unwilling to spend billions building new factories to expand production capacity anytime soon. They'll increase production as much as they can, but it won't be enough to offset the AI demand. So, we're in for a rough ride.

> **"The next economic disaster is heading consumers' way, and this time it could be much worse. Like many things profit-driven these days, it's due to AI."**

In fact, it's already started. PC RAM prices have already begun to skyrocket. One example of a 2x16GB Corsair Dominator Titanium 6400MT C32 DDR5 kit that once cost $279 three months ago, now costs $676, a staggering 240% increase! And it won't stop there. AMD has already communicated to board partners that the GPU packages it sells to them (which include the GDDR memory modules to pair with the GPU) will soon increase in cost due to market demands, meaning graphics cards will become dearer once again. Nvidia won't be immune to this either. Some estimates put this at around a $50-$150 increase in graphics card prices on the conservative side, but with PC memory already doubling, it could be worse, leading to price increases well above $200 per card.

Of course, memory is also in a lot of other devices these days, from SSDs to smart watches, robovacuums, cars – you name it. All will be affected by this over the coming few years, assuming the AI bubble doesn't burst.

If you're thinking about buying a graphics card any time soon, doing so before Christmas could be the smart play while prices are somewhat reasonable, and stocks haven't yet been affected by the new costs.

Nvidia's RTX 5000 Super series, initially slated for early 2026, is now allegedly delayed to late 2026. The 5070 and 5080 Supers were expected to boost VRAM capacities by 50% and lower prices, but their existence now seems uncertain.

This is shaping up to be about as severe as the silicon shortage during COVID and could last potentially longer. ■

Mark Williams is an IT professional with a strong interest in voiding warranties.

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The Steam Machine looks great, but the price isn't right

Valve needs to rethink pricing if it wants to challenge consoles.

Valve announced a new line of hardware (detailed on page 10) and, despite denying earlier this year that it was working on a new version of the Steam Machine, a new Steam Machine was nevertheless announced.

The cube-shaped living room PC has no price yet, but Valve has said it will cost around the same price as a gaming PC with the same specs (the specs are said to result in performance close to what the PS5 offers). In other words, the Steam Machine won't launch as a loss leader like consoles do, with a view to profiting from software and accessory sales. To put it even more succinctly: it likely won't be cheaper than $1,000 in Australia, and $1,500 is looking far more likely.

It's not surprising, though a little disappointing. Not because the price is unreasonable – no one knows the exact price yet – but because I had hoped Valve would make a serious move against the primacy of Sony and Nintendo in the living room. It's difficult to imagine anyone buying a Steam Machine if it's no more expensive to have a similarly equipped desktop PC (which – and this seems lost on a lot of people – can totally be connected to a TV and used like a console via Steam's Big Picture mode).

Valve is wealthy enough to subsidise the cost of Steam Machines, and it's surprising that it won't. Steam prints money. It has a near monopoly on gaming software on PC, and it doesn't look like its position is going to be meaningfully challenged any time soon. Look at Epic and Microsoft: these are extraordinarily wealthy and well-resourced companies who both look hapless in their attempts to try. The former spends many millions of dollars giving games away for free to tempt new sign-ups.

Valve may be wise to avoid trying to disrupt the walled gardens of Sony and Nintendo, but it has a great opportunity to do so. Steam doesn't shirtfront you for more cash if you want to play online, for example. Its library is enormous, and it doesn't want to stop you from easily using its hardware for purposes traditionally anathema to the console experience. For example, modding and emulation. I already know the Steam Machine will be better than anything Nintendo or Sony could release, at least conceptually, but Valve needs to work hard to make other people see it too.

I can't figure out how it will, though: not if the box costs more than a console. As things stand, it may capture a portion (and maybe even a massive portion) of existing Steam users, but it needs to be something a non-gaming parent might want to buy for their kids, for example. The inherent benefits of a PC-centric platform, like no monthly online fees, huge catalogue and greater flexibility, don't mean much to non-enthusiasts. And it's the non-enthusiasts – the kind who buy an FC game every year, or who main *Fortnite* – who probably need to be converted for this to make a difference.

My gaming habits won't really change if Valve fails to conquer console platforms. But I think the challenge it could feasibly represent to the big market incumbents could change gaming for the better, both for users and for the games industry. If Valve refuses to make this first generation of Steam Machine super competitive, there's no telling whether it'll get another chance. ■

Shaun Prescott is an Australian editor for PC Gamer and GamesRadar, and writes for APC, TechRadar and more.

Tech firms have learned marketing lessons from fast-food companies

But Jon Honeyball is increasingly disappointed by the goods.

There are many things to be disappointed with in modern life. Yesterday, I tried to order Indian food from a local place via a website where you can order the food. This looked just what we needed, right up until the point where the "checkout" simply said that it couldn't take card payment through the website, and that I would have to pay cash on delivery. I phoned them up, and repeated the order and then paid by card. What's the point of the ordering system on the website if you can't pay for the dinner?

> "So there are many reasons not to buy a Tesla, and its spicy leader will be one for many people."

But few things sum up disappointment more than going to a fast food joint. The photography and artwork looks fantastic: plump, filled with crisp lettuce and ripe tomato. A proper bouncy confection that makes your mouth water. Today I was tempted to try a new-to-me outfit. What appeared in real life bore little resemblance to the finely polished advert. It was flat, boring, and looked like someone had sat on it. The meat was overcooked and rubbery, the onion flaccid.

So you won't be surprised that I'm getting tired of seeing IT products that promise the earth and then leave me with a dejected sigh of disappointment. The Samsung Galaxy Z Fold7 is one such device. The hinge is magnificent, and there is almost no screen trough in the hinge area. Performance is good, the fold-out screen exceptional. However, the battery life sucks. Leave it for two days on my desk and I can guarantee that it will be flatter than that burger top bun. And the placement of the cameras means it can't sit flat on a table, which is surely a primary use case of this device. It was all going so well right up to the point where I actually started to eat it. I mean, "use it on a daily basis".

I still trundle around in a 13-year-old Audi A3, which fits my needs and works well. I would happily join the modern era and get an EV. The Tesla looks good, but I would forever be disappointed in the "Full Self Driving (Supervised)" that they offer.

They say I can buy FSD for $10,100, and it "includes Enhanced Autopilot, plus Traffic Light and Stop Sign Control." Additionally, "your car will be able to drive itself almost anywhere with minimal driver intervention." Which is a laughable shadow of what they are offering in the USA, where friends are doing thousands of kilometres without intervention. Let's face it, the assurance of long-promised features in future updates clearly means "shut up, give us the money and don't whine" because Tesla has been teasing us with this for years.

So there are many reasons not to buy a Tesla, and its spicy leader will be one for many people. For myself, the FSD is just another burger menu option. All the promise, none of the delivery. And that really grates.

Surely there should be regulators to deal with this sort of thing? Well they have done so well with water in rivers, and electricity prices and road quality. Maybe I'll just eat this lukewarm burger and floppy fries and console myself that things can't get worse. Can they? ■

Jon Honeyball includes those responsible for supermarket prepackaged sandwiches in his list.

GADGETS

Unnecessary but desirable things

Earbuds for those who consider style as important as audio quality.

Bang & Olufsen Beo Grace

PRICE $2,000 **WEB** bang-olufsen.com

With a look inspired by fine jewellery, the Beo Grace may be the finest pair of earbuds you could ever put in your ears. Crafted from polished aluminium and with a pearl-blasted aluminium charging case, the Beo Grace earbuds not only look slim and stylish, they also include 12mm titanium drivers, active noise cancellation (ANC), and offer Spatial Audio support as well as up to seven hours of battery life (with ANC on) or up to 17 hours with the charging case.

Sticking with noise cancelling, the Beo Grace earbuds also include six studio-grade microphones to help reduce unwanted ambient sounds, while their ear tips are oval-shaped for a perfect fit.

Naturally, you'll want to cosset earbuds as exclusive as these – and to that end Bang & Olufsen can also sell you a bespoke leather pouch in Infinite Black, Cranberry Red or Seashell Grey for an extra $500.

BANG & OLUFSEN
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BANG & OLUFSEN

The Beo Grace earbuds include both force-sensing controls and NearTap for easy volume adjustment.

Take your design and creativity ideas to the next level.

eufyMake E1

PRICE $4,369 **WEB** eufymake.com/au

Described as the 'world's first personal 3D-texture UV printer' the EufyMake E1 makes it easy for anyone to create cool, colourful accessories in their own home. Harnessing the power of artificial intelligence, the E1 enable you to print photos, graphics and other designs up to 5mm thick on over 300 types of material including wood, metal and acrylic, as well as on to curved surfaces, so if you've always wanted a mug with a face of your dog on, you can! The eufyMake E1 is capable of printing over one million colours and has over 20,000 templates for you to choose from.

PRICE $178 **WEB** philips-hue.com

PHILIPS HUE BRIDGE PRO

Available in a new black 'squircle' design reminiscent of the Apple TV 4K, the new Philips Hue Bridge Pro brings the company's smart home lighting system bang up to date. Now five times more powerful than its predecessor and with 15 times more memory, the Hue Bridge Pro can control up to 150 smart lights and 50 accessories – should one happen to actually own that many – and store over 500 custom lighting modes. It also adds Hue Motion Aware, a new feature that turns compatible Hue lights into motion sensors to help protect your home.

PRICE $169 **WEB** au.shop.nanoleaf.me

NANOLEAF SMART FLOOR LAMP

The joys of smart lighting cannot be unerstated, and this classy vertical colour stick is an elegant way to add some flourish to your home. It's Matter-compatible, so will work with your smart app or hub of choice. The Nanoleaf app itself is well designed and encourages experimentation, or if you'd rather skip all that fiddlery there's a simple physical switch you can use instead. Lamps like this are usually more expensive, so Nanoleaf is offering a bargain way to make your home a lot more interesting.

PRICE $TBA **WEB** playstation.com

PLAYSTATION GAMING MONITOR

While most consoles are plugged into TVs, we know that quite a few that are connected to PC gaming monitors. Sony is now ready to meet your desktop PS needs, with its just-announced PlayStation Gaming Monitor. Its specs have been clearly chosen to match the PS5 well, with a 2560x1440 resolution via an IPS display. Auto HDR Tone Mapping kicks in when connected to a PS5 or PS5 Pro for bright and vivid images. There's a charging dock for your controller, too. Initially announced for the US and Japan, it will be on sale next year.

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Can humanoid robots work?

Nicole Kobie introduces five humanoid robots that want to take our jobs, although only one has succeeded — so far.

Robotics demonstrations are always wild: you'll have seen dancing robot dogs, backflipping humanoids and other nightmare-inducing but impressive feats. But the Robbyant R1 just wanted to cook dinner, with its maker Ant Group recently demoing the human-shaped robot assembling a meal of garlic shrimp.

Dig in and even that basic task is less impressive than it sounds. While the robot takes the order, cooks the food and presents it, the prep is all completed beforehand. The Robbyant isn't standing around shelling shrimp or mixing sauces; it merely picks up a small container of ready-made ingredients and dumps it into an appliance sitting on the countertop.

Even that small bit of work happens at a pace so slow you'll be full-on hangry before your meal arrives. Most of the videos on YouTube have actually been sped up – not in obfuscation, but because they'd be long and boring otherwise. One that shows Robbyant's real pace makes for frustrating watching. The robot rolls up holding a white box, taking 17 full seconds to place it down gently onto the countertop and remove its own hands. After another 22 seconds of resetting its arm positions, it manages to pick up a small container – which would presumably hold ingredients but is empty in this video – that it dumps into a blender after another half minute, before slowly pushing a button to start the mixing process. In the background, a man watching the demonstration visibly yawns.

Good luck assembling a lasagne at that pace, mate. It would take years.

This is where we're at with humanoid robots: startups, academics and tech conglomerates alike are leaping over serious hurdles such as natural language and delicate hand movements to achieve impressive improvements in the technology. But the remaining limitations mean such robots aren't yet all that useful. They have found some success in logistics, but by this we mean shuffling boxes.

Here, we examine five humanoid robots from Tesla, Figure, Apptronik, Agility and UBtech. Only one of those is currently a commercial product at work for a paying customer, though plenty of serious trials are happening.

Beyond those companies, there are plenty more to consider: Sanctuary AI's Phoenix, Neura Robotics, Unitree Robotics, and even Boston Dynamics, which switched to an electric model a few years back and is now owned by Hyundai Motor Group. That's a handy partner for rolling out droids in car factories.

In short, it's boom times for humanoid robots – even if so far they aren't doing much more than moving boxes from one point to another.

GO FIGURE

Figure is making robots for work – in factories but also in homes.

The Figure 02, which the company describes as the world's first "commercially viable" autonomous humanoid robot, stands 5ft 6in tall, weighs 70kg, can carry 20kg and work for five hours between charges – a shade longer than its rivals.

But that's the hardware. Figure figures the special sauce is the AI that runs the machine, and its Helix is an AI system that is supposed to be generalist, letting a user give a voice command to the bot and have it figure out how to complete it, even in an entirely new situation.

A video on the Figure website shows a Helix-powered bot sorting packages: first, it picks them up, then it flips them over so the label is facing down for scanning. That's… it. Again, it's not quick at this, gingerly picking up packages before softly placing them on the conveyor belt. Figure admits it is yet to reach human-level dexterity and speed, though that's the goal and it's already cut times from five seconds to just over four, with accuracy increasing from 70% to 95%.

The point isn't that Helix can sort packages tirelessly, but that it can analyse the situation and react – in this case, seeing the packaging and adjusting its "grasp strategy on the fly", Figure says, also noting that it learned to give items in loose plastic bags a little smoothing pat to make it easier to read the label. Other trials include a partnership with BMW.

Figure also believes the Helix system could finally give us robot butlers, with no "special-case engineering, just new data". The robot is shown in a demo video picking up stacked plates and glasses and loading them in order, with Figure saying it can "adjust its strategy to account for messy starting configurations" – by which we presume it means the chaos on your countertops.

The kitchen the Helix-powered bot is cleaning up is already spotless, as are the dishes. It would be interesting to see the Figure 02 tasked with scraping beans off a plate or spotting tea dregs in a cup. And look, everyone has a preference for how to load a dishwasher, but the way it slots in the bowls, they aren't going to get clean.

That said, it's an impressive feat of AI if it truly doesn't require any fresh training. Plus picking up a delicate glass with chunky robot hands is surprisingly difficult. So Figure should get some credit, even if we'll all be loading the dishwasher ourselves for a good long time to come.

ABOVE The Figure 02 uses AI to learn – but don't let it near the dishwasher.
LEFT Agility claims its Digit is the first commercially deployed humanoid robot.

ABOVE We may have to wait a while before we see Tesla's Optimus in the wild.

TO THE BEST OF ITS AGILITY

Agility describes its Digit as the first commercially deployed humanoid robot. Some would argue with the veracity of that statement – the Pepper bot has been put to work as a guide in airports, hospitals and banks, for example – but the way that Digit is being used is closer to how most of us would imagine a humanoid robot truly working.

Digit robots are powered by Nvidia's purpose-built Jetson AGX Thor robotics computer and managed by a cloud-based system called Arc. This lets the machines be integrated into existing automation and for their workflows to be updated on the fly. So far, Digit only has about a four-hour battery life, though the robots can find their own charging station when needed, like a shuffling Roomba.

Digit is humanoid in that it's bipedal with a pair of hands and a head atop a body. But its knees, for lack of a better descriptor, are bent backwards – if you've ever had the misfortune of watching The Arrival starring Charlie Sheen, it's like that.

But don't be scared: Agility is trying to design the opposite of killer robots. Indeed, the aim is to create the first safety rated humanoid robot that's allowed by regulators to work alongside people without being locked in a cage or a work cell that keeps machines and humans apart. So far, that hasn't happened, but Agility wants something called "collaborative safety", which means freeing robots from their work cells and letting them loose in a factory or warehouse.

If this all sounds dull and safety-minded compared to the features and specs hyped up by other companies, you're not wrong. While some robotics companies show off their robots doing back flips, Agility's demos tend towards robots hefting boxes around an enclosed space.

Amazon trialled the Digit in 2023, but the robots are actually being used by GXO Logistics in Georgia, where they move boxes known as totes that hold packages, and at a bearings manufacturing company called Schaeffler in Germany – as well as inside Agility's own factory, of course. If humanoid robots become the future of the workforce, these are the first jobs on their CV.

TESLA OPTIMUS: THE ONE WE ASSUME WILL FAIL TO DELIVER

Much about Tesla's Optimus raises red flags. The 2021 launch featured dancers rather than tech, after all, and the company has made big promises with little to back them ever since: that includes a price below US$20,000 for a "genuinely useful" robot that can do everything from babysitting your kids to mowing the lawn. The plan was to make a few thousand in 2025, with high-scale production by 2026.

As ever with Elon Musk's ventures, the self-imposed deadlines look set to be ignored – but since when has that mattered? Instead, consider further challenges in Optimus' path. Earlier this year, the senior vice-president in charge of Optimus quit the company, muttering those famous words about wanting to spend more time with his family. Alongside that, reports cite sources claiming delays with supplier parts, as well as problems with the design, saying that while existing prototypes are being used in Tesla workshops to move batteries, they move slower than humans.

But this is Tesla. Frankly, no-one seems to mind if the company misses deadlines or doesn't quite deliver on promises of perfect autonomy; see the troubled Tesla robocar rollout in Austin, Texas, as an example.

If the Optimus does arrive as promised, it will look like a bi-pedal, general-purpose, autonomous humanoid. Demo videos show the shiny-faced gen-2 robot marching stiffly through a Tesla factory, doing squats in a gym, and picking up an egg and gently placing it in a cooker using tactile sensing on its fingers. In another, the robot shovels popcorn into containers – at a decent clip too.

The second version can walk 8km/h and weighs 47kg; the third generation is predicted to reach 12km/h and feature facial recognition, all-day battery life and near-perfect navigation accuracy using Lidar.

The robots will be powered by the same vision-focused AI that powers the full self-driving technology in Tesla cars, though the company said in an analyst call earlier this year that the training needs for a robot are about ten times as much a car needs to get a useful result.

Will Tesla deliver on Optimus? Given other recent missteps, it's clear that the company has plenty to be getting on with. But it's also clear that real progress has been made since a dancer in a robot suit stepped out on stage five years ago.

APOLLO: THE ONE WITH FRIENDS

Picture a humanoid robot, and Apptronik's Apollo is probably what you have in mind: its limbs go the right way, there's something like a face with two dark eyes at the centre, and it looks like a prop from a well-funded sci-fi film.

At 160lb with a height of 5ft 8in, it's properly human sized, too. That said, the modular design means Apollo can be mounted to a stationary platform if it doesn't need legs for mobility. Though the robot has the industry-standard four-hour battery life, it has hot-swappable batteries so it need not be on break during charging stints.

ABOVE UBtech's Walker is capable of hot-swapping its own battery.

Video demos show the robot creeping along with boxes in hand. Like the Digit, Apollo is designed for logistics and manufacturing, though Apptronik stresses it's a general-purpose machine that "will eventually do millions of things", with the website suggesting construction, oil and gas, home delivery and even "elder care" as future job roles. The aim is for Apollo to work alongside humans, taking on the toughest tasks such as lifting heavy objects.

There are a ongoing trials of the Apollo, including one at GXO Logistics, which has already rolled out the Digit – they're clearly keen on robots down in Georgia. Another important pilot is happening at Mercedes-Benz, where the robot has been tasked with delivering parts to production lines and even checking components. What's more, Apptronik has funding from Google, and has partnered with its AI company, DeepMind. American manufacturing giant Jabil is another partner, which will help build the robots and use them in its own operations. It even has a deal with NASA.

Apptronik isn't just betting on humanoid robots, though: this summer it launched spin-off Elevate Robots to create and commercialise designs beyond the human form.

WALKER: THE ONE OUT OF CHINA

It's difficult to choose just one Chinese robotics company to profile because the country is going big on humanoid androids, with local stars such as Keenon and EngineAI, as well as long-running robotics firm Unitree unveiling competing designs. They even hold events like robot half-marathons and kick-boxing tournaments to show off progress.

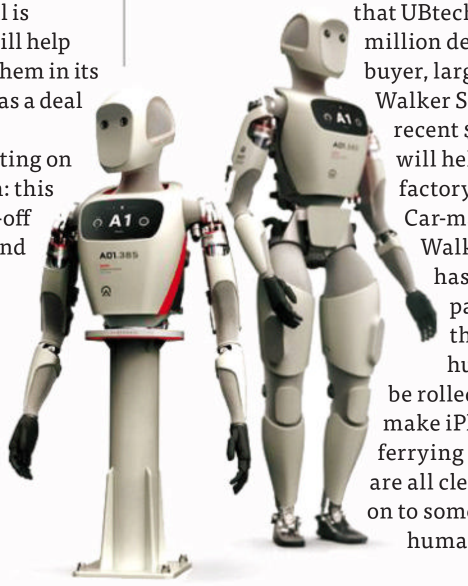
While trials in the West are centred more on logistics and warehousing, those in China are already testing the machine for potential use in nursing homes, for waste management and – reports say – even in the military for combat roles; let's hope that's not true. Already, it feels like China might be winning the humanoid robot race.

One contender for the crown in China is UBtech, which has a range of humanoid robots including the wheeled Cruzr S2 for customer service, warehouse picking, pharmacies and more. And then there's the Panda robot, which looks like the bear it's named for and is designed for entertainment more than anything else.

But the real centrepiece is the Walker. The S2 model designed for industrial uses weighs in at 70kg and 176cm in height, can walk at 7.2km/h, can pick up a 15kg load and uses multiple cameras for human-level depth perception. But forget all that: it can hot-swap its own battery!

Picture a humanoid robot's arms swinging unnaturally behind its body in order to pull out a chunk of its own back, slotting that into a charger, before replacing it with a fresh battery. It's unnerving but unquestionably useful.

Given such skills, it's no surprise that UBtech recently landed a $35 million deal with an unnamed buyer, largely believed to be for Walker S2 robots. Meanwhile, a recent $1 billion investment will help fund a robotics factory in the Middle East. Car-maker BYD is trialling Walker robots, and Foxconn has a long-running partnership with UBtech that has Walker humanoid robots set to be rolled out this year to help make iPhones, even if it is just ferrying parts about. Still, these are all clear signs that China is on to something with its humanoid robots. ■



BELOW Apollo has deals in place with organisations that include NASA.

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REVIEWS

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APC is Australia's oldest consumer technology magazine – having been consistently in print for over forty years, since our first issue way back in May 1980 – and we take that heritage and responsibility very seriously. While our focus is obviously on the personal computer the very definition of the PC has changed and shifted markedly since the early 1980s.

As such, we touch on many other areas of everyday tech, too, from smartphones and apps to peripherals, accessories, and beyond. We have two goals: to find the best modern tech and to help you make the most of it.

INDEPENDENT REVIEWS

Championing technology doesn't mean we're unrelenting yes-men and -women, however, and *APC* aims to be as objective as possible in all our coverage. That means identifying the best products from multiple perspectives – the best performance, best value and best features and, ideally, the products that offer the best mix of these three attributes.

As a matter of policy, reviews published in *APC* are not shared with product-makers prior to print. We will contact vendors under certain conditions; for example, if we have a problem testing a product that seems to indicate it may be faulty, or to invite a vendor to clarify how a particular feature works. If an *APC* reviewer has any potential conflicts of interest involving a brand, the review will always be assigned to another writer.

LABS TESTING

APC strives to conduct the most rigorous, objective scientific tests and benchmarks we can so as to make our reviews as unbiased as possible. We use a variety of tools and programs for this, including many freely available benchmark suites for assessing media encoding, general system performance including storage read and write speeds, gaming and battery life.

APC EDITOR'S CHOICE

When a product scores 4.5 out of 5, it carries the Editor's Choice Award. These are products that exceed expectations and deliver a quality experience up there with the very best.

APC HIGHLY RECOMMENDED

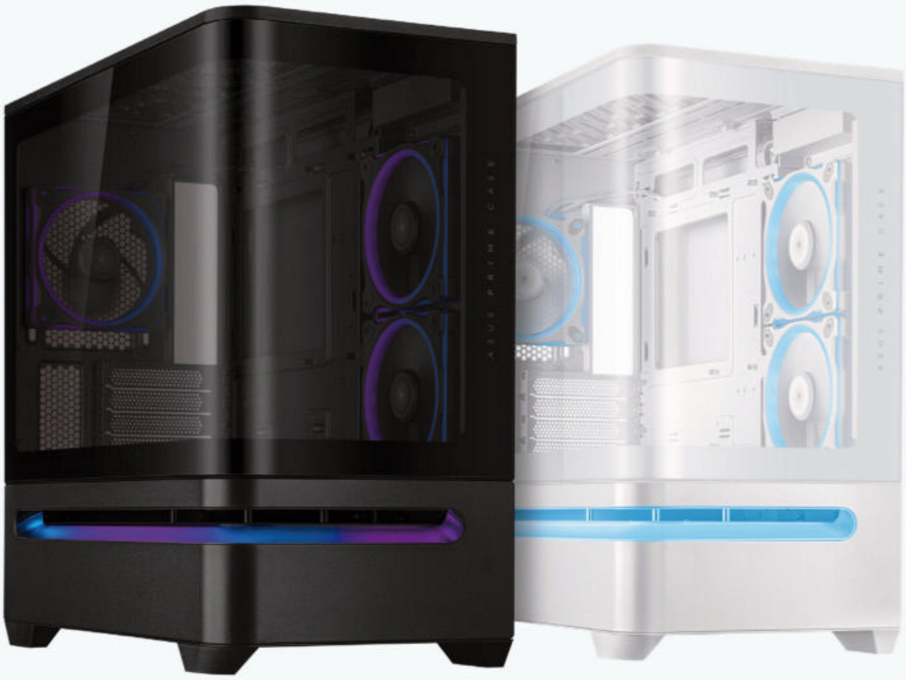
You will see this award if a reviewed product has scored four out of five stars. It means most people can expect satisfying performance from the product, and that we would use it ourselves.

PRICE $149 **WEB** asus.com/au

Asus Prime Case AP202

Asus' new mATX PC case looks pretty in pictures, but does function match its form?

apc HIGHLY RECOMMENDED



Those familiar with Asus' PC cases might raise an eyebrow at the Prime AP202. There's no Asus branding and, when you peer closely, appearance-dominated first impressions give way to an industrial design journey.

The first thing you notice is the curved, tempered-glass panel that extends from the front to the left-hand side. It's easy to remove thanks to the only two thumbscrews on the case (at the rear).

Below it is a large inlet that draws-in air to cool the graphics card (and internals) from below. We're a little surprised that no magnetic dust cover was included here and it's probably worth buying a long, 360mm strip to add to it, accordingly.

It's also worth noting that the three included case fans are rather weak (1,600rpm max) and configured as exhausts so, if you're needing to force cool air inside for high-end gaming, you'll probably want to add (up-to three) 120mm fans on top of the inlet (although a third one can be impacted by some graphics cards' cables).

The inlet features ARGB lighting which syncs up with the two 120mm exhaust fans on the right-hand side and the other at the rear (they're all height-adjustable). It all makes for a bottom-to-top airflow system that might not be the most performant (out of the box) but, nonetheless, looks highly attractive.

At the top you've got the power button, two USB-A 3 ports, a USB-C and a 3.5mm jack. The top-side mesh panel is clipped-on and can be easily pulled off with your fingertips revealing space for a 360mm AIO cooling radiator or three 120mm (or 140mm) fans beneath. That all means you can fit up to nine fans in the AP202.

At the rear at the bottom sits the downward-facing PSU mount (max 200mm in size). Beneath it, there's a grille, with a removable, magnetic, dust-filtering, mesh slice, on the base.

> "The Prime AP202 feels very well built and high quality. All edges are smooth and nothing important feels flimsy."

The whole lower section of the case is a (mostly) isolated compartment that also includes room for two 3.5-inch hard drive slots, at the front.

Also at the rear, there are four slots to cater for the micro-ATX motherboard expansion cards, a grille that covers the GPU exhaust port (the maximum length of a graphics card is 420mm), plus space for the motherboard's I/O ports.

Opening-up the right-hand side panel simply involves pulling it open from the top. Doing so reveals wide, Velcro cable ties and a dedicated cable channel to assist with neat cable management – which is handy considering that each fan has a four-pin PWN connector and three-pin ARGB connector.

Cable channelling is very forgiving at the rear for those who aren't particular about cable management. However, there are no grommets to pass cables through which means there are large cable-filled gaps visible from through the case's main window. There are large cutaways that provide access to rear sections of the motherboard but, oddly, they are not arranged to support Asus' BTF rear-mounted, hidden-connector technology.

Ultimately, the Prime AP202 feels very well built and high quality. All edges are smooth and nothing important feels flimsy. While the weak fans might prove an issue to demanding users, this case isn't really targeted at them. Nonetheless, despite a few foibles, and though it might be expensive at $149, it's highly attractive and will look good (but not imposing) on anyone's desk. ■

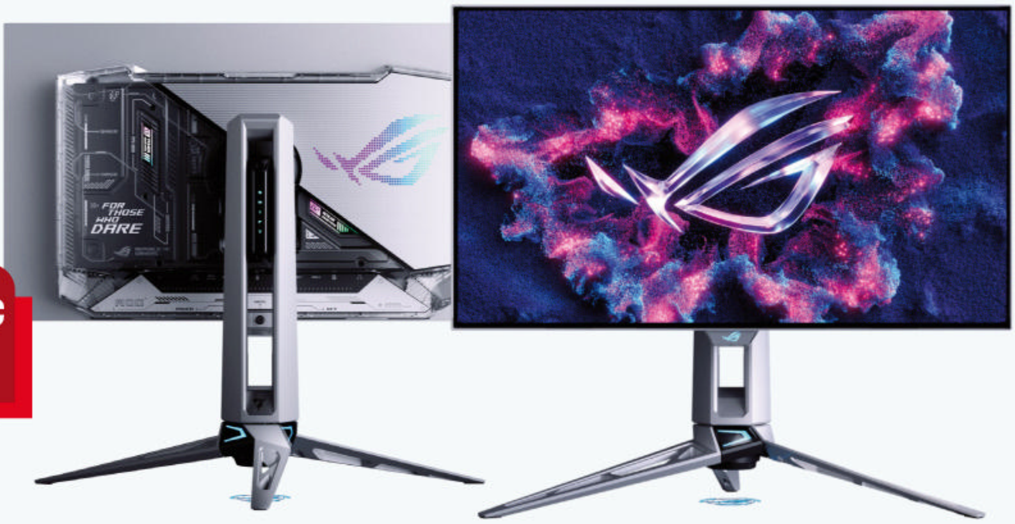
SPECS mATX PC Case; 2x USB-A 3.0, 1x USB-C 3.0, 1x 3.5mm audio jacks; 3x 120mm fans. Tool-less, dual-chamber design; 441 x 236 x 460mm; 9KG.

VERDICT

★★★★☆

Asus' Prime AP202 is a very pretty (and pricey) mATX case. But, it doesn't come fully equipped for high-performance workloads.

NICK ROSS



apc
EDITOR'S CHOICE

PRICE $1,999 **WEB** rog.asus.com/au

Asus ROG Swift OLED PG27AQWP-W

Asus has made a stupid-fast, 720Hz gaming monitor using new Tandem OLED technology.

Another month, another groundbreaking Asus gaming monitor. This time it's the ROG Swift OLED PG27AQWP-W which is a dual-mode, 27-inch, 1440p beast that runs at 540Hz natively, or at 720Hz at 720p – for FPS players who are part fly. Even more notable, however, is its innovative Tandem OLED technology which uses two, stacked, old-school, WOLED (4th Gen) panels. Interesting.

The tl;dr benefits are that Tandem OLED offers: more brightness by using two panels; less power consumption by running the panels in parallel; better colour accuracy through voltage manipulation of the different layers; and a 60 per cent longer lifespan (with less burn-in risk) due to the lower power requirements. All good?

Unfortunately, the first issue quickly reared its head... text on the Windows Desktop, and in office documents, is noticeably spidery. It's not by a deal-breaking amount for casual consumers, but if you're tempted to use this for daily office work, know that we quickly found our eyes struggling with small text. Fortunately, things improved quickly from there.

Firstly, despite OLED's inherent glossy surface, Asus' 'Zero Haze' coating makes a decent fist of banishing reflections. They're still unavoidable when viewing dark content in a bright environment but otherwise, kudos to Asus for delivering a slap to the laws of physics.

Colour, contrast and true black performance are as superb as you'd expect from any OLED panel and it supports 99.5 per cent of the complicated, DCI-P3 colour space, which designers will like. HDR compatibility means details are simultaneously visible in bright and dark areas with the latter almost hurting your eyes when set to high. It's top-drawer for multimedia and there are plenty of settings to (easily) tinker with via the joystick-button and OSD, plus Asus' comprehensive DisplayWidget Center app.

As for speed, the combined 0.02ms pixel response time and 540Hz refresh rate makes motion-blur practically imperceivable and in-game-smoothness exceptional. In 720Hz mode, rapidly moving objects become razer-sharp and on-screen action becomes even smoother. It might be by an infinitesimal degree, but big-money eSports tournaments get defined by such margins. Just note that, at 720p, only competitive FPS games and those with basic graphics are worth playing, as anything cinematic looks terrible.

The hardware itself looks great with Asus' usual ROG RGB flourishes plus a transparent rear panel. The large tripod base takes up significant desk space, but it's very stable and facilitates generous amounts of adjustment in every direction.

Other highlights include DisplayPort 2.1 UHBR20 for uncompressed video delivery (from future graphics cards); a KVM switch; Asus OLED care technology that's augmented with a proximity sensor to turn the screen off when nobody's watching; 24.5-inch Full HD screen mode for eSports; uniform panel brightness technology; Nvidia G-Sync; GamePlus image enhancements for different game genres; and multiple onscreen crosshair options (with sniper zoom). Note that there's no USB-C port.

We've previously declared the PG27AQWP-W's sibling monitors to be near perfect, but this raises the bar for speed, brightness and longevity... albeit at the expense of text clarity. So, if you've two grand to spend, you've got new choices to make. ■

SPECS 27-inch, semi-gloss, 2,560 x 1,440, HDR10, 540Hz (720Hz at 720p in Dual Mode), Tandem OLED; 0.02ms GTG response time; 1,500-nit brightness; 1,500,000:1 contrast; 1x DisplayPort 2.1, 2x HDMI 2.1, 3x USB-A 3.2 Gen 1, 1x USB-B 3.0 upstream, headphone jack; Tilt +25° -5°, Swivel +30° -30°, Pivot +90° -90°, Height +110mm; 606 x 548 x 274mm, 7KG.

VERDICT

★★★★★

It raises the bar for OLED brightness, speed and longevity, but it's at the expense of text reproduction.

NICK ROSS

PRICE $599 **WEB** www.gigabyte.com

Gigabyte M27UP

A dual-mode, 4K gaming monitor that doesn't cost the Earth? Count us interested.

We've seen some stunning monitors in our labs over the past year, but they've arrived with astronomical price tags. Gigabyte's M27UP gaming monitor is one-quarter the cost of some and so, what are the compromises?

The first noticeable difference is the sub-7KG weight. The base and stem connect to the panel without tools but they're thinner and lighter than premium rivals. This counts for nothing, though, as it sat solidly on our desk, wobble-free.

There are no geometric or colourful design flourishes, but we missed none of that: the sharp lines and black bezel are still stylish. The stand also facilitates pivot, tilt and height-adjustments, so it doesn't feel limiting.

The 27-inch panel itself has an impressive, native-UHD (3,840 x 2,160) '4K' resolution which provides plenty of multi-window, desktop real estate for those who want it for work, too. It's an edge-lit IPS screen whose colour vibrancy, accuracy and contrast are some way off all the OLED-levels we've become accustomed to and everything feels slightly washed-out. But, it's not a deal-breaker for undemanding users and few would gripe about it displaying a screen full of colourful multimedia. Details can also be seen in both bright and dark areas of the screen... just not at the same time owing to the limited (non-HDR) 1,000:1 contrast ratio. It's also got a matte finish which makes it (refreshingly) reflection free.

Its 1ms grey-to-grey response time marries with a 160Hz refresh rate to keep very-fast-moving objects rendered smoothly and blur free. Only pernickety, competitive FPS players might grumble and Gigabyte has them covered with its 320Hz 'Dual Mode' feature which drops the (usable) screen size (to 24-inches), the resolution (to HD, Full HD or similar) and can facilitate a 4:3 aspect ratio. It's very effective and virtually all remaining blur gets banished.

> "Its 1ms grey-to-grey response time marries with a 160Hz refresh rate to keep very-fast-moving objects rendered smoothly and blur free."

However, it's not all good news. Switching to Dual Mode often crashed the screen or it turned black – taking minutes to reactivate. Furthermore, when it came to multimedia, monochromatic transitions quickly turned into a noisy blocky mess that destroyed immersion (colourful transitions only exhibited a not-uncommon minor stepping). Switching on Windows HDR is a hack that can address this, but while it smoothed-out all transitions, activating it (and deactivating it) insta-crashed both the monitor and our main PC. It didn't happen on all PCs, but it was a repeatable bug. Deactivating HDR could even require a second screen. Hmm.

More positively, the twin, 5-Watt speakers got loud and offered reasonable fidelity. There's just not much bass. They're nice to have for casual video-clip watching, though.

Other features include a KVM switch and Gigabyte's configurable Game Assist features like 'on-screen crosshair' and 'sniper zoom' which can be activated via a programable 'Tactical Switch' button. The standard image tweaks and presets are all present and they're all easily accessed via a bottom-mounted joystick button plus an intuitive and responsive OSD.

At $599 it would represent very good value, but the repeated mode-change glitches became maddening. Hopefully a firmware addresses the issue, but potential buyers should be wary. ■

SPECS 27-inch, matte, 3,840 x 2,160, 160Hz, IPS (360Hz, Full HD Dual Mode); 1ms GTG response time; 350-nit brightness; 1,000:1 contrast; 2x HDMI 2.1, 1x DisplayPort 1.4, 1x USB-C 3.2 Gen 1, 1x USB-B 3.2 Gen 1, 2x USB-B 3.2 Gen 1, 3.5mm audio jack; Tilt +21° -5°, Pivot +90°, Height +130mm; 2x 5-Watt speakers; 612 x 515 x 192mm, 6.7KG.

VERDICT

★★★☆☆

A well-featured, affordable, dual-mode, 4K gaming monitor that's blighted by foibles and glitches.

NICK ROSS

ViewFinity S8

PRICE $899 **WEB** www.samsung.com

Samsung ViewFinity S8 37

A 16:9 37-incher for productivity at a nice price.

A 37-inch desktop monitor is on the larger side. We're not quite in the realm of some of the largest gaming monitors you can get with the Samsung ViewFinity S8 37, but then this is a 4K UHD-capable 37-inch screen that can sit on your desk for only $899, which feels quite aggressively priced for a display at this size.

Setting up a larger monitor is always a little trickier entirely because they're bigger, though Samsung does keep this relatively simple with a classic latch-in back panel and simple square stand to slot in. The most significant issue you're going to have here is unavoidable; a 37-inch monitor is slightly heavy and quite bulky.

On the connectivity front you've got DisplayPort, HDMI and USB-C choices at the rear back, with a side panel housing USB-A, Ethernet ports and a headphone jack. That's not a terrible assortment of choices, though it's smart to get them lined up and sorted out during installation, because reaching around the back or underside of a monitor at this size isn't a simple undertaking.

The ViewFinity S8 37 features a simple small nub joystick for OSD controls located at the bottom middle of the back of the display, which is easy enough to find in a hurry, because it's right behind the truly tiny Samsung logo. Bonus points to Samsung here, because this isn't a monitor that screams its brand name to everyone at all; it's quite subtle in that regard.

All so far so fine, and the Samsung ViewFinity S8 37 might seem like a true bargain if you're keen on a big screen monitor for your entertainment purposes. While the ViewFinity S8 37 certainly is big and attention grabbing when it's that close to your eyeballs, it's not a fast monitor at all, with a refresh rate of just 60Hz and a stated response rate of 5ms. Unless your gaming ambitions go only as far as *Minesweeper*, that's just not going to cut it, but even for more mundane tasks like scrolling through web pages it can be noticeable.

The Samsung ViewFinity S8 37 is instead built and pitched towards productivity-centric users, with an inbuilt KVM for multi-device support, picture-in-picture to take advantage of all of it screen real estate and the ability to tilt and swivel to suit just about any desk-based working situation, at least in theory.

The ViewFinity S8 37's adaptive picture mode is meant to dynamically adjust the brightness to lessen eye strain. That's something of a mixed bag in real world testing, as it often tended towards overly dim tones even in lower-lit environments, though the change in hue with the eye care mode on is quite significant.

Like most VA panels, the Samsung ViewFinity S8 37 does present poorly if you're not looking at it square on, though at this size on a single desk that's not likely to be a problem unless you're using it as a meeting monitor. For basic productivity work if you really do feel that 34 inches isn't going to cut it for your needs it's fairly priced, but a bit of bargain hunting can find faster 34-inch screens without too much stress. The choice to opt for 16:9 is also unusual for a productivity display like this. ■

SPECS 37-inch, 3,840 x 2,160 16:9 119ppi, 60Hz, VA, 5ms response time, 350-nit brightness, 3,000:1 contrast; Ports: 1xHDMI (HDCP2.2), 1xDisplayPort (HDCP2.2), 3x USB-A, 1xUSB-C (90W charging), Ethernet, Headphone jack, integrated KVM Switch , Tilt -5.0˚(±2.0˚)~20.0˚(±2.0˚) Swivel -30.0˚(±3.0˚)~30.0˚(±3.0˚); Dimensions: 823.9x648x250mm (HxWxD including stand) 8.9kg including stand.

VERDICT

★★★☆☆

Fairly priced but with some distinct limitations, best suited for simpler office tasks.

ALEX KIDMAN

PRICE Pro: $1,999 (256GB), Pro Max: $2,199 (256GB) **WEB** apple.com/au

Apple iPhone 17 Pro/Pro Max

For photos and videos there's really no better choice.

apc
EDITOR'S CHOICE

The iPhone 17 Pro and Pro Max showcase a new design, with the camera bump extending across the entire back of the phone. In my view, it's a smart update: the full-width bar feels more "Pro", and the aluminium unibody casing feels cooler in your hand than the old titanium edging. Enhanced Ceramic Shield coatings on the front and back provide better scratch and crack resistance than any previous model, and Apple has also introduced a bold new Cosmic Orange colour, along with Deep Blue and Silver for those who prefer a more serious look.

The OLED display is perfect for sunny days. Both phones reached almost 1,000cd/m2 in our SDR tests with adaptive brightness on, with the Pro Max hitting 1,899cd/m2 in HDR content, while an improved anti-reflection layer means noticeably less glare, especially in direct sunlight.

At the rear, the two phones have the usual triple-camera array, but the 5x zoom camera enjoys a boost to 48MP (matching the main and wide cameras), with a larger sensor for improved image quality. As on all of this year's iPhones, the front camera uses a new 18MP square sensor that can automatically switch from portrait to landscape mode to suit the scene – or you can switch it yourself.

Video pros will appreciate new support for ProRes RAW and Genlock support, for precise syncing across multiple cameras. Personally, I'm more interested in the ability to shoot from the front and rear cameras together in "Dual Capture" mode, plus better stabilisation for the front camera, which worked remarkably well even when I filmed myself jogging up a hill.

The A19 Pro processor inside the iPhone 17 Pro and Pro Max combines six-core CPU and GPU units, with neural accelerators to speed up tasks such as generating AI images. Sure enough, I found that Image Playground generated images three to four seconds faster on the iPhone 17 Pro than on last year's model.

> "Enhanced Ceramic Shield coatings on the front and back provide better scratch and crack resistance than any previous model, and Apple has also introduced a bold new Cosmic Orange colour, along with Deep Blue and Silver for those who prefer a more serious look."

As well as top performance, Apple says its new handsets offer the longest battery life yet. The Pro promises up to 31 hours of video playback on a full charge, while the Pro Max pushes that to a huge 37 hours. Our web-surfing test confirmed a definite improvement: the iPhone 17 Pro Max lasted an epic 17hrs 54mins, well ahead of the iPhone 16 Pro Max's 14hrs 17mins. Both models also recharge more quickly than ever before, if you spring for the sold-separately 40W charger.

iOS 26 brings numerous upgrades of its own, including the sleek Liquid Glass design, new call-handling features and various app updates. There's not much new in the way of AI, though: next year's major Siri update should improve things, but for now Apple's lagging behind Android rivals, which already offer features such as cross-app actions and voice-controlled photo editing.

One reason to pay the Pro Max premium is if you want the bigger screen: since the Plus variant has been discontinued this year, the Pro Max is your only choice if you want a roomy 6.9in display. The other big reason to go with a Pro model is the optical zoom, which delivers beautifully sharp close-ups that you simply can't capture on any other model. You'll have to decide for yourself whether that's enough to justify the cost. ■

SPECS 6-core Apple A19 Pro SoC; 12GB RAM; 6-core Apple GPU; 6.3in 120Hz AMOLED screen, 1,206 x 2,622 resolution/6.9in 1,320 x 2,868; 5G; 256GB/512GB/1TB/2TB (2TB Max only) storage; nano SIM; IP68; 48MP/48MP/48MP rear cameras; 18MP front camera; Wi-Fi 7; Bluetooth 6; NFC; 3,988mAh/4,832mAh battery; USB-C 3.2 Gen 2 connector; iOS 26; 72 x 8.8 x 150mm/78 x 163 x 8.8mm. (WDH); 206g/233g; 1yr warranty.

VERDICT

★★★★★

A bold design statement backed up by killer performance and amazing battery life for the Pro Max in particular.

MARK SPOONAUER

PRICE $1,399 (256GB) **WEB** apple.com/au

apc EDITOR'S CHOICE

Apple iPhone 17

The 17 offers more for your money than the others in Apple's new range.

While the iPhone Air is the eye-catching new arrival, the entry-level iPhone hasn't been neglected – in fact, it's quietly received its biggest upgrade in years. For a start, the base model now comes with 256GB of storage, twice as much as the iPhone 16, for the same price. The display is larger too, while the front and back benefit from a sturdier Ceramic Shield coating that's supposedly three times as scratch resistant as the old one. It still feels the same in the hand, neither noticeably larger nor heavier, although I'm not a fan of this year's subdued colour options, which look rather apologetic next to the richer, bolder tones of the iPhone 16.

Apple achieves the larger screen by making the bezels skinnier, resulting in something close to a true edge-to-edge display. It looks fantastic, with rich colour and, finally, a 120Hz refresh rate. Brightness has improved too – I measured a peak of 1,505cd/m2, up from the iPhone 16's 1,348cd/m2. Coupled with improved anti-reflective coating, this makes the iPhone 17 a joy to use even in bright sunlight.

The back of the iPhone 17 features the familiar dual-camera arrangement, but the wide-angle camera has been boosted to 48 megapixels, matching the main module, for more detail and better macro performance. The front camera gets an upgrade too with an 18MP resolution and a wider field of view. A square sensor lets you choose portrait or landscape framing regardless of which way round you're holding the phone, or the phone can automatically adjust the framing to suit the scene.

The results look a lot like pictures shot on the iPhone 16, with crisp detail and bold, bright colour. Low-light performance is a particular strength, with excellent detail even in the darkest areas. Video capture goes up to 4K resolution at 60fps, with the new Dual Capture mode enabling you to record video with both the front and rear cameras at once – so you can share a scene and comment on it simultaneously. This is nice to see but overdue, as the best Android phones have long offered this feature.

Inside, the iPhone 17 uses Apple's new A19 chip. It feels slicker and more fluid in use than the previous iPhone 16, but that has more to do with the boosted refresh rate than the processor.

Apple makes big claims for the iPhone 17's battery, promising more than eight extra hours of video playback compared to the previous model. We saw an improvement in our lab tests but not such a drastic one – the iPhone 17 lasted 34 minutes longer than the iPhone 16, achieving 12hrs 47mins of continual use. In practice I'm getting all-day battery life, but demanding users may need to top up at a certain point.

Happily, recharging is faster than before, with a 29W wired charger taking the battery from empty to 39% in 15 minutes, and to 71% in 30 minutes. That's a marked improvement over the iPhone 16, and 25W Qi 2.2 charging is now supported too.

With twice the storage capacity, a better display, faster charging and enhanced cameras, it's frankly amazing that the iPhone 17 costs no more than last year's model. If you want an optical zoom, market-leading performance and maximum battery life then you should still consider the Pro, but the iPhone 17 is an excellent phone in its own right, and easily the best bang-per-buck deal in Apple's line-up. ■

SPECS 6-core Apple A19 SoC; 12GB RAM; 5-core Apple GPU; 6.3in 120Hz AMOLED screen, 1,206 x 2,622 resolution; 5G; 256GB/512GB storage; nano SIM; IP68; dual 48MP/48MP rear cameras; 18MP front camera; Wi-Fi 7; Bluetooth 6; NFC; 3,692mAhbattery; USB-C 2 connector; iOS 26; 72 x 8.8 x 150mm (WDH); 177g; 1yr warranty.

VERDICT

★★★★★

Better value than last year thanks to a heap of upgrades to the screen, storage offering and performance.

JOHN VELASCO

PRICE From $579 **WEB** store.google.com/au

Google Pixel Watch 4

The new King of Android smart watches.

apc EDITOR'S CHOICE

Like the Pixel Watch 3, the Watch 4 comes in 41mm and 45mm sizes, each available with or without cellular connectivity. It looks almost identical to its predecessor, but offers 10% more screen real estate thanks to a reduction in bezel size. The domed display is easy to read at any angle, with a peak brightness of 3,000cd/m2. That's 50% brighter than the Watch 3, and also 50% brighter than the latest Apple Watch.

The familiar crown and button remain on the side of the device, but there's now two metal contacts on the other side that work with the new upright charger. This lets you use your watch as a mini alarm clock while it's charging.

Another change is that the Pixel Watch 4 is the first Google watch with a replaceable battery and display. It has to be done by a certified technician, but it still makes this one of the most sustainable, repairable wearables around. And this doesn't affect water resistance: the watch is rated for submersion at depths of up to 50 metres.

Functionally, the biggest new feature in the Pixel Watch 4 is the ability to wake the Gemini AI assistant by simply raising your wrist – meaning you never need to say "hey, Google" again. Gemini is a fantastic asset to have on your wrist. Unlike Apple's Siri, it can answer super-specific questions on any topic under the sun, and suggest smart, contextual replies to messages. For example, if someone texts you "Are you still coming to dinner?", Gemini can check your calendar and location and come up with an automatic reply such as "I'm running 10 minutes late."

The assistant can also retroactively identify workouts, assuming you were wearing your watch while completing them. So, if you forget to start tracking a run, the watch will send you a notification after you've finished, saying something to the effect of, "It looks like you went for a run. Do you want me to save this as a workout?"

The Google Pixel Watch 4 makes a highly accurate fitness tracker. An updated GPS antenna with two bands instead of one promises better location accuracy, and I found its automated pace and distance reports were very close to my own manual measurements.

For tracking other aspects of health, the Pixel Watch 4 offers the same tools as its predecessor: the only hardware change here is an upgraded skin temperature sensor, which Google says should make sleep stage tracking more accurate. Sleep reports are comprehensive, giving you a daily sleep score out of 100, plus metrics for time spent asleep, time spent in REM versus light and deep sleep, oxygen variation tracking and sleeping heart rate. The Pixel Watch 4 also maintains the ability to detect loss of pulse, and to trigger an alert if it suspects you've been in a fall or a car crash.

One last update that every wearable owner will welcome is extended battery life. Google claims the 45mm Pixel Watch 4 will run for 40 hours in standard mode, or 72 hours per charge in low-power mode; the smaller model is rated for 30 hours and 48 hours respectively.

So whether you're looking at display quality, fitness features or endurance, the Google Pixel Watch 4 compares very favourably to other smartwatches. ■

> "The assistant can also retroactively identify workouts, assuming you were wearing your watch while completing them."

SPECS 4-core Qualcomm Snapdragon W5 Gen 2 processor; 1.2in 408 x 408/1.4in 456 x 456 OLED touchscreen (up to 3,000cd/m2); 32GB storage; dual-band Wi-Fi 6; Bluetooth 6; optional 5G; GPS; UWB; NFC; eSIM; single mic; single speaker; body temperature sensor; blood-oxygen sensor; ECG sensor; electrical and optical heart-rate sensor (gen 3); altimeter; compass; gyroscope; water resistance to 5 ATM; IP68; 325mAh/455mAh battery; Wear OS 6; 41 x 12.3 x 41mm/45 x 12.3 x 45mm (WDH); 31g/37g; 1yr RTB warranty.

VERDICT

★★★★★

Class-leading battery life coupled with a big, bright screen – and Gemini AI – make this the best Android smartwatch.

DAN BRACAGLIA

apc
HIGHLY RECOMMENDED

PRICE $1,799 (256GB) **WEB** apple.com/au

Apple iPhone Air

For many, this could be the most desirable iPhone of them all.

The iPhone Air is the boldest new iPhone design in years. It replaces the iPhone 16 Plus in Apple's lineup – but rather than going big, this model goes thin, with a thickness of just 5.6mm. It's a striking innovation, and one that comes with certain compromises, but depending on your priorities it could be your perfect iPhone.

DESIGN AND DISPLAY

Clearly, the point of the iPhone Air is its thinness – but when Apple says it's 5.6mm thick, it unaccountably omits to mention the camera bump, which also contains many of the core components. This gives the phone a maximum thickness of 11.3mm – thicker than a regular iPhone 17 – but because it's all up at the top of the body, the phone still feels thin in the hand, and slips nicely into a shirt pocket.

And because the bump (Apple calls it the "plateau" because bump is so passé) runs all the way across the body, the phone doesn't wobble on a table when you set it down.

The Air comes in Sky Blue, Cloud White, Light Gold and Black; in my view the Black finish makes the design look cheap, but the Sky Blue nicely shows off the Air's thin profile. You might worry about the durability of a phone this thin, but I've seen a demo in which the iPhone Air happily survived a bend with 60kg of force. The screen is also protected with a Ceramic Shield 2 display, while the Ceramic Shield back is purportedly four times more crack resistant than glass.

The display itself measures 6.5in across the diagonal, with slim bezels that make for a nicely pocket-friendly size. It's a good screen too, with an OLED panel for rich colour and contrast, a dynamic refresh rate that scales from 1-120Hz and a rated maximum brightness of 3,000cd/m2. Partnered with Apple's own anti-reflective coating, that makes the iPhone Air brilliant to watch outdoors.

CAMERA

To help achieve the iPhone Air's extraordinary design, the camera hardware has been cut down. The phone features a single 48MP sensor with 2x optical zoom, and that's it; there's no separate telephoto or wide-angle lens.

For what it does, though, the main camera is impressive. Putting it head to head with the Galaxy S25 Edge – its closest rival in the thinness stakes – I found the Air delivered much more realistic looking colours and a sharper overfall image. In low light too the Air did a much better job of capturing detail than the S25 Edge, whose shots looked like a blurry mess in comparison. The 2x zoom does give you some ability to get closer to your subjects, although when you go up to the maximum 10x magnification, you can clearly see the smudging that's characteristic of digital zoom.

Video is also a little limited: the Air can't match the 120fps 4K capture of the iPhone 17 Pro, although most people will be happy with 60fps. And you miss out on fun features like Cinematic mode for recording videos with shallow depth of field. On the plus side, you do get Dual Capture mode, which records using the

SPECS 6-core Apple A19 SoC; 12GB RAM; 5-core Apple GPU; 6.5in 120Hz AMOLED screen, 1,260 x 2,736 resolution; 5G; 256GB/512GB/1TB storage; eSIM; IP68; 48MP rear camera; 18MP front camera; Wi-Fi 7; Bluetooth 6; NFC; 3,149mAh battery; USB-C 2 connector; iOS 26; 75 x 5.6 x 156mm (WDH); 165g; 1yr warranty.

front and back cameras at the same time. The iPhone Air has the same square 18MP front sensor as found on the iPhone 17, 17 Pro and 17 Pro Max, so you can shoot in landscape in both directions at once, or conveniently capture selfies in widescreen.

PERFORMANCE AND BATTERY

The iPhone Air uses the same powerful A19 Pro chip as the iPhone 17 Pro and Pro Max, and the Geekbench 6 benchmark shows that its CPU performance is very close to those market-leading devices.

However, the GPU in the Air is limited to five cores, rather than the six used in the Pro handsets, and that makes this phone less of a gaming powerhouse than its siblings. While I enjoyed smooth performance when playing *Destiny: Rising*, the Air fell behind in the demanding 3DMark Solar Bay Unlimited graphics benchmark, and in the 3DMark Wild Life Extreme Stress Test. On the plus side, I found it didn't get as hot as the iPhone 17 Pro Max, making it feel not only slim in the hand, but comfortably cool.

Aside from performance, you might wonder about the iPhone Air's battery life, given the lack of space for a chunky battery. In our standard web-surfing test – loading a series of pages over 5G at a standard brightness of 150cd/m2 – it lasted a decent 12hrs 2mins, which is only 45 minutes less than the regular iPhone 17. However, both phones fell far short of the iPhone 17 Pro Max, which ran for nearly six hours longer.

To extend the Air's battery life, Apple sells a $159 MagSafe power pack that snaps onto the back of the phone. I found this made a big difference, allowing the Air to carry on surfing 17 hours and 15 minutes. I imagine you wouldn't want to use this every day though, as it defeats the purpose of buying such a thin and light phone.

Tue Apr 1
9:41
Prep prop kit
Make fake icing

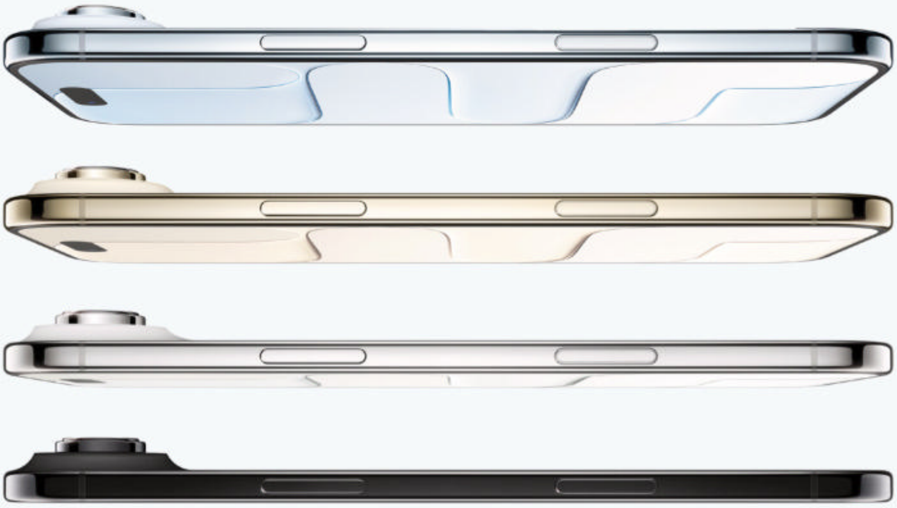
The iPhone Air also doesn't get the fast 40W charging that the iPhone 17 and iPhone 17 Pro series enjoy; in our testing I found 30 minutes of charging took the battery to 55%, which is okay rather than great.

VERDICT

The iPhone Air is a remarkable piece of engineering. Despite the lump, the overall impression is amazingly thin and light, and Apple deserves particular credit for making it so durable. It feels so strong I honestly don't think I'd bother with a case. While it's not the fastest phone around, performance is fine for everyday tasks, and the phone remains fairly cool under pressure.

However, I don't like that the slim design means you have to give up both the ultrawide lens and the dedicated zoom, and it's disappointing to miss out on Cinematic Mode video and fast charging too. The iPhone 17 Pro costs just $200 more and gets the full feature set, along with boosted graphical performance.

So the decision boils down to how much you care about having a (largely) super-thin phone. In terms of style and svelteness there's simply nothing out there to rival the iPhone Air, but you will have to live with some trade-offs if you want something this compact: it's an iPhone Light in more ways than one. ■



VERDICT

★★★★☆

A stunningly thin design, impactful display and the latest A19 Pro chip, but there are inevitable sacrifices.

MARK SPOONAUER

PRICE From $679 **WEB** apple.com/au

Apple Watch Series 11

The standard Apple Watch gets welcome upgrades.

TUE
APR
1
10:09
84
Sleep Score
High
apc
EDITOR'S CHOICE

I was delighted when Apple revealed that the Apple Watch Series 11 delivers a full 24 hours of battery life. For me, that's the standout upgrade in the new model – and it's no empty promise. Even with the always-on display enabled, I've found I can wear the watch overnight and recharge at my convenience during the day. It's a revelation after having to work around an 18-hour battery for so long.

There are a few other improvements. The cellular model has now moved from LTE to 5G, enabling a faster, smoother data connection, and the wide-angle OLED screen now features tougher glass..

My one wish is that Apple had taken the opportunity to make the display brighter. It's readable, but not as bright as the latest watches from Samsung or Google, and the difference is noticeable outdoors. If you want maximum brightness in Apple's ecosystem, you need the Apple Watch Ultra 3.

Still, I can't complain too much as the Series 11 costs just the same as last year's Series 10. It looks identical too, with the same dimensions and very similar weights. The standard models come in aluminium casing, in Jet Black, Rose Gold, Silver or a new Space Grey option that I found myself gravitating towards. Alternatively, you can pay a premium for Slate, Gold, or Natural titanium cases.

The accompanying watchOS 26 software brings new features of its own, although these aren't hardware-exclusive, and will also work on older Watch models. New blood-pressure alerts can detect possible hypertension, based on the optical heart rate sensor.

There's also a new Sleep Score feature with reports and advice on your night in bed. Live message translations are available too, but only when paired with an Apple Intelligence-compatible phone.

Although the latest Apple Watch isn't a major update, the jump in battery life is very welcome, while 5G support and improved scratch-resistance add convenience and durability. If you already own a Series 9 or 10 then it might not be worth upgrading, but for first-time buyers or those overdue for a refresh, the Apple Watch Series 11 offers a superb combination of design, performance and longevity. ■

VERDICT

★★★★★

All-day battery life, 5G support and a tougher display, but at the same price as last year's model.

KATE KOZUCH

SPECS Apple S10 chip; 42mm 374 x 446 or 46mm 416 x 496 OLED touchscreen (up to 2,000cd/m2); 64GB storage; dual-band Wi-Fi 4; Bluetooth 5.3; optional 5G; GPS; UWB 2; NFC; eSIM; single mic; single speaker; depth gauge to 6m; water temperature sensor; body temperature sensor; blood-oxygen sensor; ECG sensor; electrical and optical heart-rate sensor (gen 3); altimeter; compass; gyroscope; water resistance to 50m; IP6X; claimed 36hr battery life; watchOS 11; 42 x 9.7 x 36mm/46 x 9.7 x 39mm (WDH); 30g to 43g; 1yr RTB warranty.

PRICE From $1,399

WEB apple.com/au

Apple Watch Ultra 3

A big watch with big features.

Thanks to a re-engineered battery, the Apple Watch Ultra 3 now lasts a massive 42 hours on a charge, and in low-power mode you can stretch it to around 72 hours. Charging is faster too, giving you about eight hours of use from 15 minutes of charge, or going from zero to 80% in 30 minutes.

The screen meanwhile is the largest of any Apple Watch to date, thanks to slimmed-down bezels. It's not a huge change – the display has expanded from 410 x 502 pixels on the Ultra 2 to 422 x 514 – but on a device this small, every little bit of extra space makes a difference. It's Apple's brightest watch too, with a peak brightness of 3,000cd/m2 – 50% more than the Apple Watch Series 11, and three times as bright as the SE 3.

Otherwise, the design is pretty much the same as before, down to the orange Action Button on the side and 100m water resistance. But there is one other upgrade that you might be thankful for in an emergency – the ability to share your location and details via satellite when you're out of cellular range. This joins existing safety features such as fall detection and crash detection.

On the software front, the Apple Watch Ultra 3 gains hypertension alerts and the new Sleep Score feature – although since these are built into the latest watchOS, they'll also work on older Ultra 2 models. If your phone has Apple Intelligence you can use the watch with the new "Workout Buddy" feature, which provides encouragement during workouts, puts your activity in context of your history and tracks upcoming milestones.

Still, it remains a very bulky smartwatch to wear all day. The

apc
EDITOR'S CHOICE
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149
9'01" CURRENT PACE
9'12" AVERAGE PACE
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152SPM CADENCE

other issue is the price: it comes in just one configuration (in either Natural Titanium or Black Titanium), which includes 5G support but costs more than twice as much as the regular Watch.

Even so, with the biggest, brightest display, the longest-lasting battery and both cellular and satellite connectivity, this is the ultimate watch for people who want everything Apple has to offer on their wrist. ■

VERDICT

★★★★★

Bulky and expensive, but a great choice if you want the best battery life, biggest screen and a rugged design.

KATE KOZUCH

SPECS Apple S10 chip; 422 x 514 OLED touchscreen (up to 3,000cd/m2); 64GB storage; dual-band Wi-Fi 4; Bluetooth 5.3; optional 5G; satellite connectivity; GPS; UWB 2; NFC; eSIM; three-mic array; dual speakers; depth gauge to 40m; water temperature sensor; body temperature sensor; blood-oxygen sensor; ECG sensor; electrical and optical heart-rate sensor (gen 3); altimeter; compass; gyroscope; water resistance to 100m; IP6X; claimed 42hr battery life; watchOS 11; 49 x 12 x 34mm (WDH); 62g; 1yr RTB warranty.

PRICE From $399 **WEB** apple.com/au

Apple Watch SE 3

The perfect set of essentials.

The SE 3 now feels less like a compromise than ever, thanks to the addition of an always-on display and 5G connectivity. The latest model benefits from almost all the software upgrades in watchOS 26, including the Flow watch face (for showing off Liquid Glass), the on-wrist Notes app, live message translations and even "Workout Buddy", the Apple Intelligence-powered fitness coach. Motion gestures and on-device Siri are supported too: as well as protecting your privacy, that means Apple's voice assistant can do some things even when the watch is disconnected from Wi-Fi or a smartphone.

My favourite upgrade though is easily the always-on display. For me, being able to glance at the time without having to lift my wrist every single time is a huge quality-of-life improvement.

On the cellular model, 5G support is another benefit. This isn't just about online performance: the new antenna supports more bands, and can intelligently merge connections to keep you online in areas of patchy coverage without draining your battery. It's also nice that the cellular upgrade costs only an extra $90, compared to the $200 extra on the Series 11.

For health and fitness tracking the SE 3 covers the essentials like step counting, automatic workout detection and custom workout creation. Its heart-rate sensor isn't as advanced as the one on the Series 11, so it won't support hypertension alerts, but a new skin-temperature sensor helps the Cycle Tracking app provide more accurate ovulation predictions.

10:09
Sleep Score
84
High
Mar 31 – Apr 1
apc
HIGHLY RECOMMENDED

It looks like an Apple Watch, but an older model: the display is noticeably smaller than the Series 11's, and the 1,000cd/m2 brightness doesn't hold up as well in direct sunlight. The colour choices are limited too, to just Starlight and Midnight, although you can of course accessorise with a wide range of bands.

This watch doesn't have the ECG capabilities of the Series models. That would make me hesitant to pick the SE 3 for a parent or someone at higher risk. For most first-time buyers though the latest Apple Watch SE is a great choice, delivering an experience that's remarkably close to the Series 11 at a far lower price. ■

VERDICT

★★★★☆

The always-on display and 5G option mean this year's SE is less of a compromise than previous models.

KATE KOZUCH

SPECS Apple S10 chip; 40mm 374 x 446 or 45mm 416 x 496 OLED touchscreen (up to 1,000cd/m2); 64GB storage; single-band Wi-Fi 4; Bluetooth 5.3; optional 5G; GPS; NFC; eSIM; single speaker; body temperature sensor; blood-oxygen sensor; optical heart-rate sensor (gen 2); altimeter; compass; gyroscope; water resistance to 50m; claimed 18hr battery life; watchOS 11; 40 x 10.7 x 34mm/44 x 10.7 x 38mm (WDH); 26g to 33g;; 1yr RTB warranty.

apc
HIGHLY RECOMMENDED

PRICE $2,699 (256GB) **WEB** store.google.com/au

Google Pixel 10 Pro Fold

Buying a phone is often a game of compromises, as we find here.

Talk about a tough act to follow. The Pixel 10 Pro Fold arrives in the wake of the Samsung Galaxy Z Fold7 – a phone so thin and light that it comprehensively raised the bar for foldable phones – we called it "a triumph of engineering and design". Yet in my testing of Google's new foldable, I've found it beats Samsung's in several ways.

The Pixel 10 Pro Fold is chunkier than the Galaxy Z Fold7, but there's a definite advantage to its design. Google's new gearless hinge provides excellent protection against water and dust intrusion, making it far more rugged than rivals: excitingly, it's the first foldable we've seen with an IP68 rating. The Galaxy Z Fold7 by contrast only bears an IP48 rating, which means small particles of dust can get in there, and you definitely shouldn't take it to the beach if you want the hinge to survive.

BRIGHTER DISPLAYS

The big attraction of the Pixel 10 Pro Fold is, of course, its fold-out 8in OLED display. That being the main selling point, you naturally want things to be as vibrant as possible, whether you're surfing the web, streaming Netflix or running two apps side by side. And I'm delighted to report that the Pixel 10 Pro Fold literally outshines the Galaxy Z Fold7: in our testing its peak brightness exceeded 2,500cd/m2, versus 2,000cd/m2 for Samsung. The front 6.4in screen is brighter than the Samsung's, too.

BATTERY AND CHARGING

The Pixel 10 Pro Fold also beats its rival in battery capacity. Google builds in a 5,015 mAh battery, 14% larger than the 4,400 mAh unit inside the Z Fold7. While comparing amp-hours doesn't always give a true reflection of how long different phones can go between charges, in this case I did see a real benefit in real-world longevity. In our web-surfing test, carried out over a 5G mobile connection, the Pixel 10 Pro Fold lasted a very good 12hrs 16mins, while the Samsung Galaxy Z Fold7 conked out after 10hrs 44 mins.

When it's time to juice back up, Google's 67W wired charger (sold separately) can take the Pixel 10 Pro Fold from empty to 58% charged in 30 minutes – slightly better than the 54% from Samsung's foldable.

CAMERAS

The Pixel 10 Pro Fold's main camera has far fewer pixels than the Galaxy Z Fold7's – we're talking 48MP versus a huge 200MP resolution – but pixel count doesn't always translate to quality, and I found I generally preferred the results I got from Google's camera phone.

For example, portraits taken in the same setting came out crisper

SPECS 8-core (3.8GHz/3.1GHz/2.3GHz) Google Tensor G5 processor; 16GB RAM; PowerVR DXT-48-1536 graphics; 8in foldable 120Hz AMOLED screen, 2,076 x 2,152 resolution; 6.4in cover 120Hz AMOLED screen, 1,080 x 2,364 resolution; 256GB/512GB/1TB storage; nano SIM and eSIM; IP68 rating; triple 48MP/10.8MP/10.5MP rear cameras; dual 10MP/10MP front cameras; Wi-Fi 7; Bluetooth 6; 5,015mAh battery; USB-C 3.2 Gen 2 connector; Android 16 (7 OS updates); folded, 76 x 10.8 x 155mm (WDH); unfolded, 150 x 5.2 x 155mm (WDH); 258g; 1yr warranty.

and brighter on the Pixel 10 Pro Fold, although I prefer the texture of the Samsung's bokeh effect. The Pixel also did a better job in low light, picking up plenty of fine detail on Halloween decorations and achieving beautiful colour balance on a tricky shot of a pink hydrangea under yellow streetlights.

Where the Pixel 10 Pro Fold really pulls ahead is in zoom performance. Its 5x optical zoom lens gives it a fundamental advantage over the Samsung with its 3x zoom, and lets you push farther into the digital zoom range with less loss of quality. Urban shots taken on the Fold at 10x magnification were much cleaner and detailed than those taken with the Samsung.

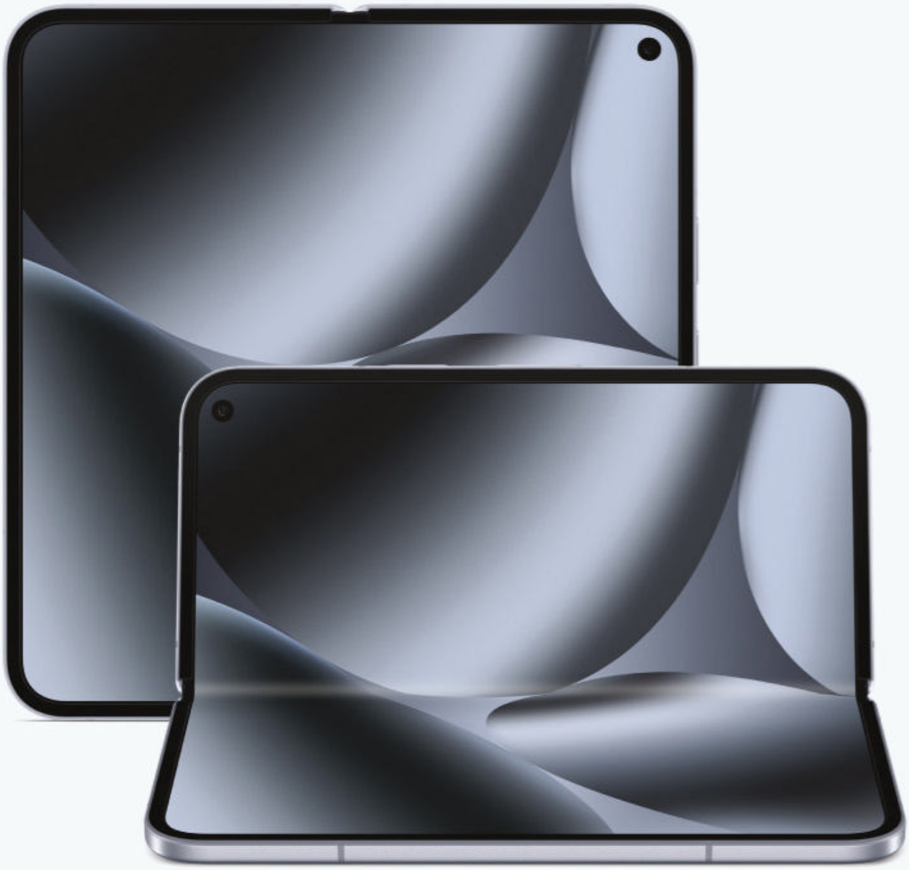
POWERFUL AI (WHEN IT WORKS)

The Pixel 10 Pro Fold has so many AI features that frankly I think it's overkill – but there are some that really stand out. Personally I'm a big fan of Auto Best Take, which automatically stitches together an optimised group photo from multiple shots, and I love the way you can instantly call up Gemini Live to ask questions, or get information about whatever's around you or what's on your screen.

Google's signature Magic Cue feature left me somewhat unimpressed. The idea is ingenious on paper: it's supposed to pop up whatever information you might need in the moment, without your having to jump between multiple apps. So, for example, if I phone an airline with a question about my flight, the details ought to show up from my calendar. Unfortunately, this feature didn't always work for me. When I did have occasion to call Qantas about an upcoming trip, Magic Cue was indeed smart enough to pull the details from my calendar – but it showed the wrong info, taking flight times from a different email.

SIZE AND PERFORMANCE

Despite all the good points I've mentioned about the Google Pixel 10 Pro Fold, I'd choose the Galaxy Z Fold7 without hesitation. That's simply down to the relative size and weight of the two phones. The Pixel 10 Pro Fold measures 5.2mm thick when open and 10.8mm when closed, and it weighs 258g; that's fine for a back pocket, but distinctly larger than the Z Fold7, which is 4.2mm thick when open and 8.9mm closed, and weighs 215g – slim and light enough to carry around in my shirt pocket. The difference is noticeable when you see the phones side by side, and you can really feel it if you use them for a prolonged period, such as when playing games.



> “Where the Pixel 10 Pro Fold really pulls ahead is in zoom performance. Its 5x optical zoom lens gives it a fundamental advantage over the Samsung with its 3x zoom, and lets you push farther into the digital zoom range with less loss of quality.”

Another relative weak point of the Pixel 10 Pro Fold is its Tensor G5 chip. In our labs testing we saw the Pixel 10 Pro Fold trail behind the Galaxy Z Fold7's Snapdragon 8 Elite chip by 1,500 points in one 3DMark graphics test. And the Pixel 10 Pro took over two minutes to finish our video transcoding test, compared to 52 seconds for the Z Fold7.

While it's hardly a dealbreaker, I should also mention that the Pixel 10 Pro Fold is limited to running two apps side by side. The Galaxy Z Fold7 can run three apps at once, so that gives you a bit more flexibility. At least it's easy to create app pairs on the Pixel so that you can drag and drop content between windows.

THE BOTTOM LINE

I like the Pixel 10 Pro Fold a lot more than I expected to. With big bright screens, great battery life and strong photography credentials, it's a real pleasure to use. And the IP68 rating is a real load off my mind.

If you want a foldable that doesn't compromise the portability of a regular phone, you may prefer the Samsung. But if you can live with a slightly bulkier format, the Pixel 10 Pro Fold is the most capable and versatile folding phone money can buy. ■

VERDICT

★★★★☆

Impressively vibrant displays, a durable design and strong battery life, but the price remains too high.

MARK SPOONAUER

GAME EMULATOR

NEEDS Windows 10 or 11 **WEB** play.google.com/googleplaygames

Google Play Games on PC

A world of (often) good free games awaits.

Google Play Games lets you play more than 200,000 free Android games on your PC, using your mouse rather than a touchscreen. Launched in beta two years ago, it's now officially available for everyone to download.

Before you do, be aware that your PC needs at least 8GB of RAM and 10GB of free storage – Google recommends an SSD. If your system doesn't meet those requirements, some games may not launch or display properly.

The games span genres including arcade, board, puzzle, simulation and word, and include versions of *Monopoly*, Chess, Hangman, Solitaire and *Tetris*. You can play perennial favourites *Angry Birds*, *Candy Crush Saga* and *Cut the Rope*, as well as strategy games such as *Clash of Clans*. Visit **tinyurl.com/APC553games** to browse a selection of available titles.

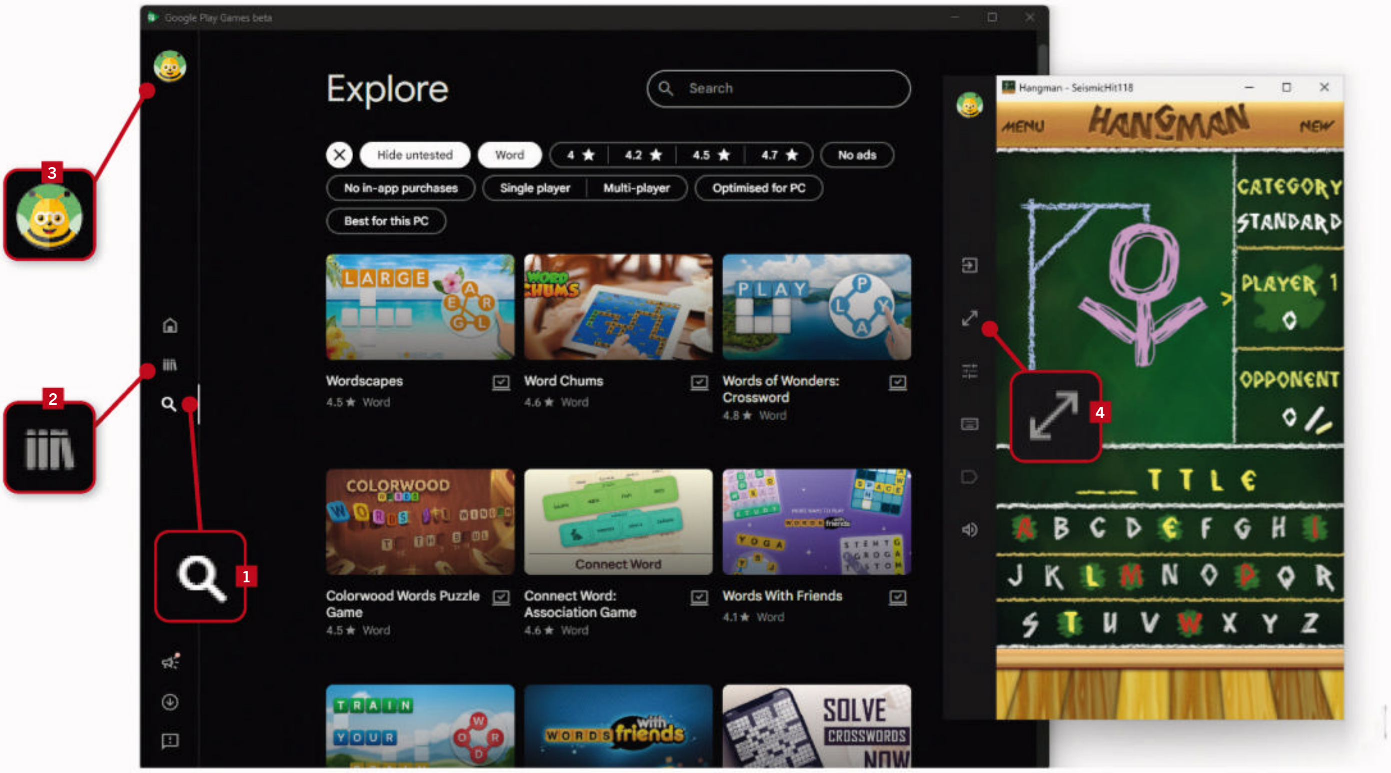
Mobile games are often stuffed with ads and in-app purchases, so Google Play Games offers useful filters to show only titles without those annoyances. Many games have been optimised for PCs, which means you can control them using your keyboard as well as your mouse.

Press Shift-Tab to view a game's keyboard controls, if it has them. These are typically W, A, S and D for forward, left, backward and right, and Spacebar for jump, but you may be able to change them to your preference.

When you install a game, it appears in your Google Play Games library. Click 'Play' to open it in a resizable window that you can move anywhere on your screen, or make it full-screen for a distraction-free gaming experience.

You don't need to own an Android device to play games in Google Play Games – just sign into your Google account in your browser when installing the software.

If you have an Android phone or tablet, you can sync your game progress as well as scores and achievements through the Google Play Games mobile app (**tinyurl.com/APC553play**).


Google Play Games beta
Explore
Search
Hide untested
Word
4 ★
4.2 ★
4.5 ★
4.7 ★
No ads
No in-app purchases
Single player
Multi-player
Optimised for PC
Best for this PC
Wordscapes
Word Chums
Words of Wonders: Crossword
Colorwood Words Puzzle Game
Connect Word: Association Game
Words With Friends
Hangman - SeismicHit118
MENU
HANGMAN
NEW
CATEGORY
STANDARD
PLAYER 1
OPPONENT
1
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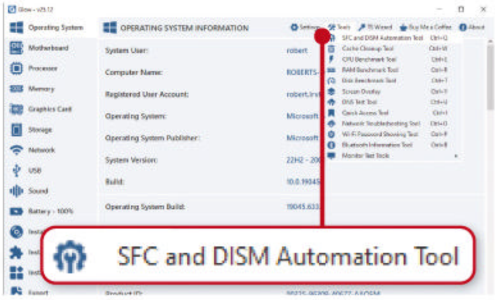
1 Click the Search button to open the Explore tab and find games to play. You can filter the 200,000 free titles by genre, rating (4 stars and above), single and multiplayer, and view only games with no ads or in-app purchases.

2 The Library tab lists all he games you've installed, as well as details of their size. Click the 'Play' button next to an entry to open the game in a new window. You can also create desktop shortcuts for your favourite games.

3 Click your profile icon to change your username and picture for Google Play Games. Click 'Settings' to switch off Windows notifications for new games and offers, and to manage your privacy preferences for the program.

4 The left-hand toolbar in a game window includes options for playing it full-screen and tweaking visual settings, such as the screen resolution and mouse-pointer size. You can also adjust or mute the volume for the game.



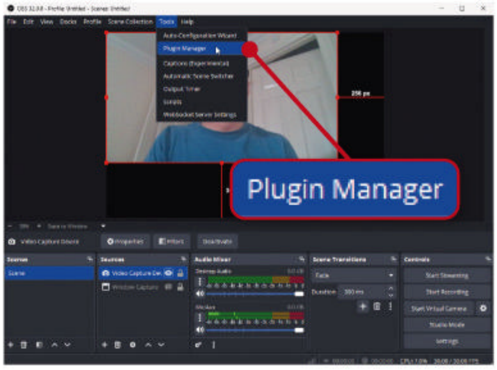
SYSTEM-INFORMATION TOOL

NEEDS Windows 10 or 11

WEB www.turkaysoftware.com/glow

GLOW 25.12

Glow has been updated significantly since we last looked at it, with a steady stream of new options and improvements to existing tools. It can now detect which version of Microsoft Office you have installed (on its Operating System tab) and the drivers for wireless headphones you've connected to your PC using a USB dongle (on its Drivers tab). Glow's CPU Benchmark, Disk Benchmark and Cache Cleanup tools have been reprogrammed to make them more efficient, and the program has been optimised to launch faster in Windows 11. Best of all, when you run the 'SFC and DISM Automation Tool' from the Tools menu, Glow now performs the system-file checks and fixes within its own window, rather than Command Prompt. Glow still triggers a SmartScreen warning (its developer is discussing this issue with Microsoft), but just click 'More info' then 'Run anyway'.



VIDEO-CAPTURE TOOL

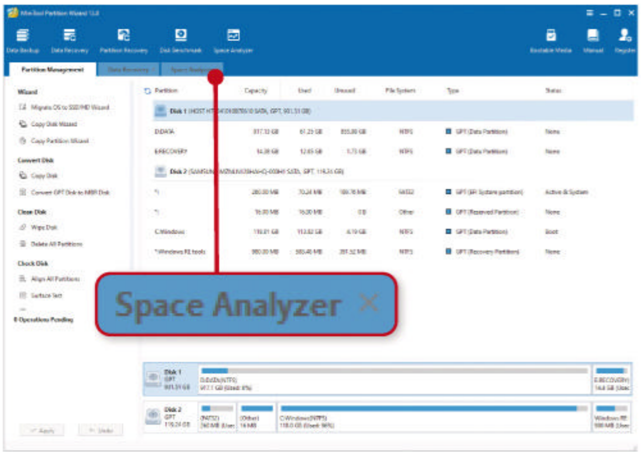
NEEDS Windows 10 or 11, macOS or Linux

WEB obsproject.com

OBS STUDIO 32

This versatile program for recording and streaming live video has been updated with several new tools. The most notable addition is a Plugin Manager, which lets you view and disable all the plug-ins you install in OBS Studio. There are hundreds to choose from at **obsproject.com/forum/plugins**, and they add useful features such as face tracking, video filters and advanced controls. You can access the new Plugin Manager in the Tools menu (see screenshot) – the Browse option is currently greyed out but will presumably be active in a future update. OBS Studio has also added voice-activity detection for video recordings and streams, and chair removal – which hides your chair when you superimpose yourself on a background. However these options require an Nvidia RTX GPU and Nvidia Broadcast software (**tinyurl.com/APC553broadcast**).

Should I pay for?



PARTITION WIZARD

PRICE US$59 per year

FREE TRIAL PERIOD Limited free version

NEEDS Windows 7, 8.1, 10 or 11

WEB tinyurl.com/APC553mini

MINITOOL PARTITION WIZARD PRO

With most freemium software, forking out for the paid-for version unlocks all its available features. That's not the case with MiniTool Partition Wizard, which has three Pro editions – standard, Platinum and Ultimate – and three other commercial plans designed for businesses.

The Free version offers the basic options you need for partitioning your hard drive, including creating, deleting, resizing, merging, splitting and wiping partitions. It also has a handy space analyser (see screenshot), but lacks dynamic disk-management tools for working with volumes – the formatted parts of a partition that store data. Nor can it copy a partition containing Windows boot files or migrate your operating system to an SSD.

Those options are available in the standard Pro edition and partly justify its steep price. That plan also lets you create a bootable version of Windows, convert an NTFS partition to FAT (the free version can only do vice versa) and change the size of clusters (units of disk space).

However, even MiniTool Partition Wizard Pro can't recover lost data from inaccessible drives or restore deleted partitions. When you try, you're prompted to upgrade to Pro Platinum, which costs an eye-watering US$109 a year. That version doesn't offer much else for the extra $50, other than a three-device licence and Windows Server support.

OUR VERDICT: DON'T PAY FOR IT

Unless you do a lot of advanced partitioning, the free version of MiniTool Partition Wizard has enough features for everyday use – just be prepared for upgrade nags. The standard Pro edition lacks the option to recover deleted partitions, which you'd expect for that price. ■

> **"The Free version offers the basic options you need for partitioning your hard drive, including creating, deleting, resizing, merging, splitting and wiping partitions."**

apc
HIGHLY RECOMMENDED

WEBSITE BUILDER

PRICE $173/year **WEB** elementsapp.io **NEEDS** macOS 13 or later

RapidWeaver Elements

A website builder that's made for pros but is surprisingly accessible.

How the web has changed in the 21 years since Realmac Software brought us one of the first template-based website editors in RapidWeaver. Its new successor Elements is aimed at a broader market, from those building their first website to teams of professionals, indeed anyone who wants to develop visually rather than primarily in code.

It's built on Tailwind, an extensive open source CSS-based framework that makes theme customisation simple using CSS variables. It features rich transitions and animations, and most importantly trims unused CSS to minimise the storage space required for websites.

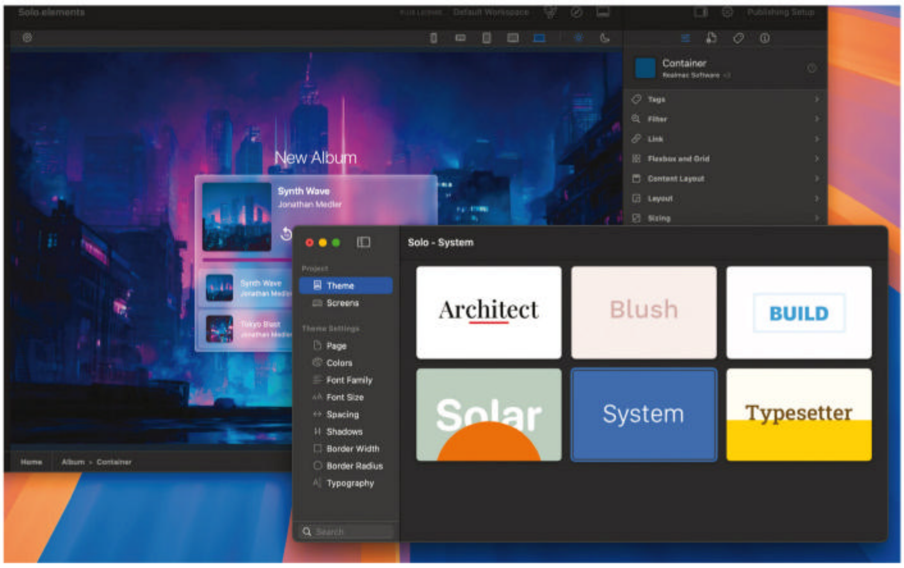
Elements is far more than a friendly front-end to Tailwind, though. Each Elements project for a website is stored in a convenient bundle, and has an overall Theme based on Tailwind config files. Themes set colours, font families and sizes, default spacing and other global options. Six are provided, ready to be customised and added to. Importing projects from RapidWeaver Classic is also supported, although that's still in beta.

There's a rich choice of ready-made components you simply drop onto the web page. These support forms with checkboxes, radio buttons and attachments, include media such as audio and video, with special provision for SVG using Apple's SF Symbols library, and several types of layout. Completed components in web pages can then be added as globals for use on other web pages.

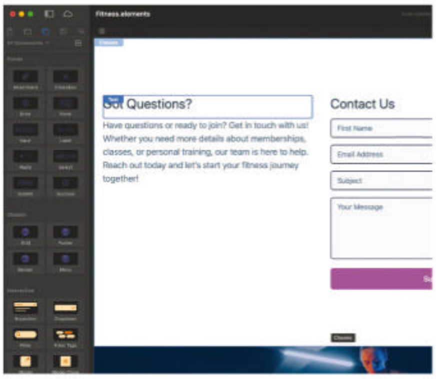
OPTIONS AND SUPPORT

Components are combined and enhanced into a library of templates for page elements like podcast players and captioned photos. Support for columns is particularly good and flexible. You can assemble your own within a container, or use ready-made templates for two columns with an image on the left or right. Nesting those in the hierarchical node browser, in the left sidebar, offers even more options to deliver almost every conceivable gridded layout.

> "Elements is aimed at a broader market, from those building their first website to teams of professionals, indeed anyone who wants to develop visually rather than primarily in code."


Solo.elements
Publishing Setup
Container
Realmac Software
Tags
Filter
Link
Flexbox and Grid
Content Layout
Layout
Sizing
New Album
Synth Wave
Jonathan Medler
Tokyo Blast
Home
Album › Container
Solo - System
Project
Theme
Screens
Theme Settings
Page
Colors
Font Family
Font Size
Spacing
Shadows
Border Width
Border Radius
Typography
Search
Architect
Blush
BUILD
Solar
System
Typesetter

Standard themes can be customised using the listed settings.


fitness.elements
Contact Us
First Name
Email Address
Subject
Your Message

Got Questions?

Have questions or ready to join? Get in touch with us! Whether you need more details about memberships, classes, or personal training, our team is here to help. Reach out today and let's start your fitness journey together!

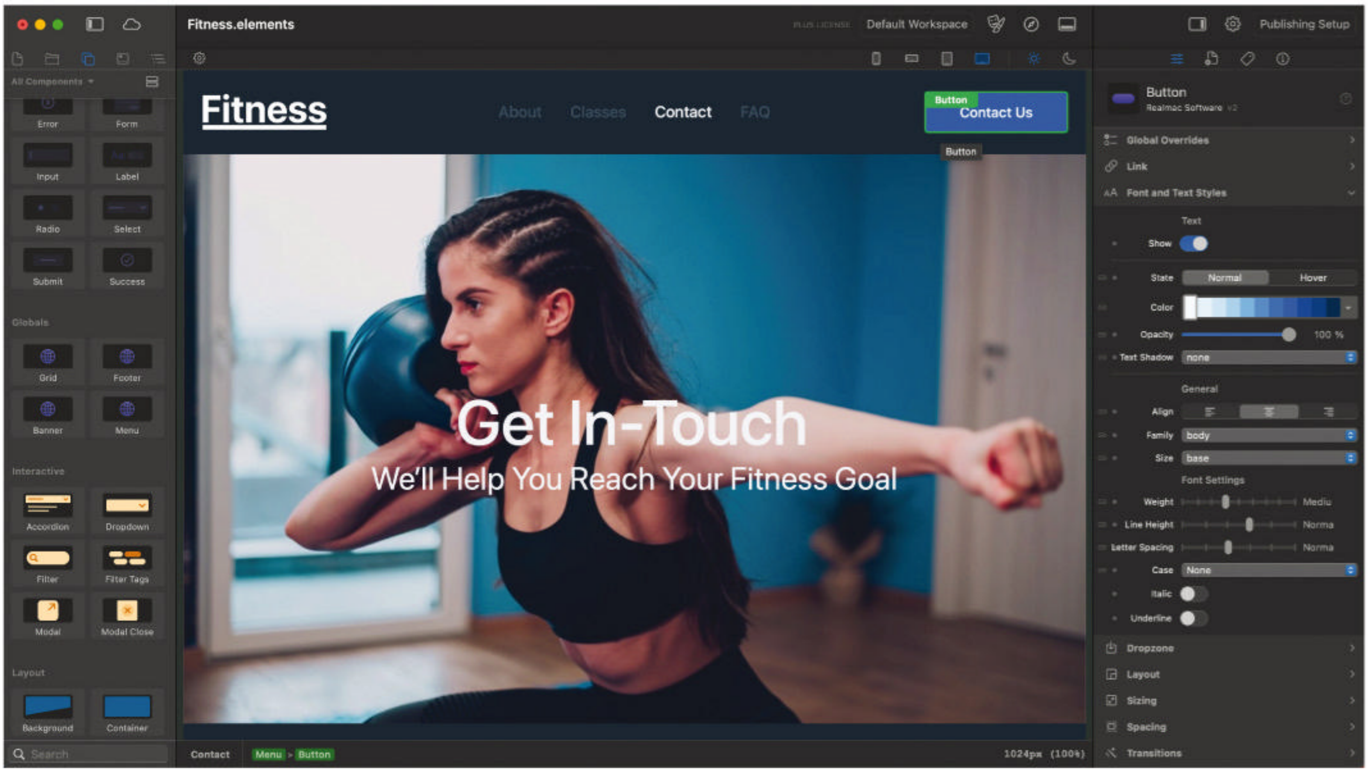
Global styles are set in the Theme and adjusted by block.

Component settings are edited in the right sidebar, and cover standard properties from text face and colour to sizing and spacing, as well as many special effects including transitions, filters and transforms, courtesy of the Tailwind core.

For those who want to dig deeper into the source code, each element can be inspected through the contextual menu. This provides a standard inspector window with panes containing the source, variables, and a box model with properties. The same inspector also offers extensive support for debugging, performance assessment, audit and other advanced tools.

Unlike full-blown content management systems, Elements doesn't incorporate a database, but is growing support for basic features using Markdown files with PHP. These make it simpler for others to contribute content for collaborative websites. There's also an Elements API for creating add-on Element Packs containing HTML, JavaScript, CSS and other files.

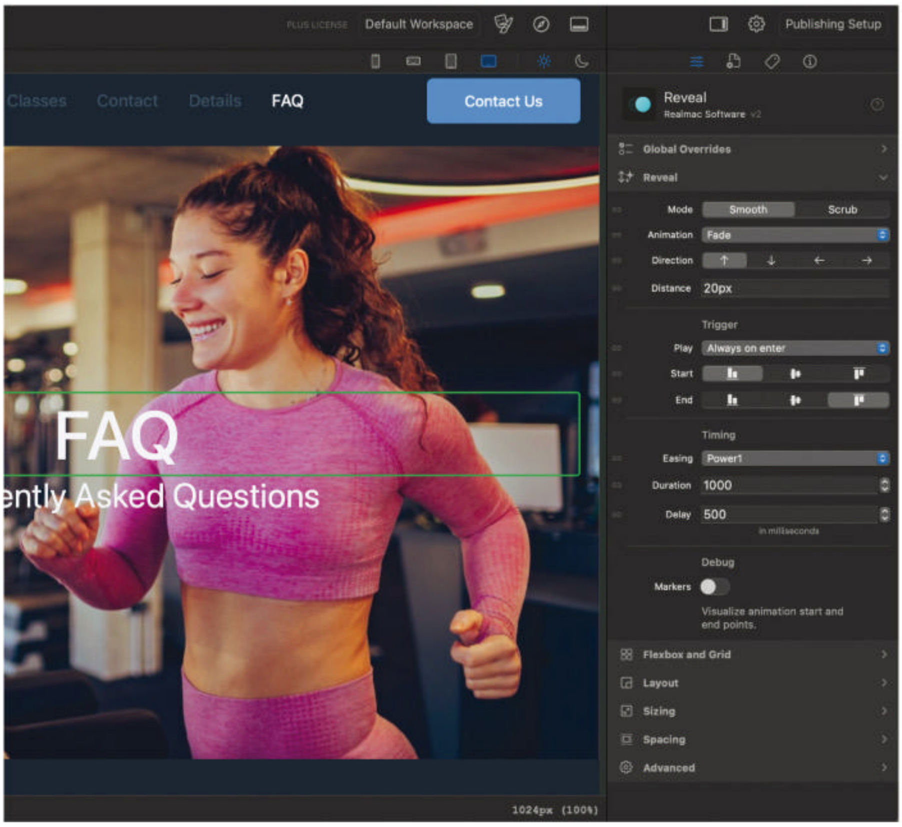
Pages can be viewed and adjusted for a range of six display sizes, from small mobile phone screens to large desktop displays. Building in support for Dark Mode is gloriously simple; switch the page view to Dark Mode, change colours as needed to make the page


Fitness.elements
Default Workspace
Publishing Setup
All Components
Error
Form
Input
Label
Radio
Select
Submit
Success
Globals
Grid
Footer
Banner
Menu
Interactive
Accordion
Dropdown
Filter
Filter Tags
Modal
Modal Close
Layout
Background
Container
Search
Fitness
About
Classes
Contact
FAQ
Button
Contact Us
Get In-Touch
We'll Help You Reach Your Fitness Goal
Contact
Menu > Button
1024px (100%)
Button
Realmac Software v2
Global Overrides
Link
Font and Text Styles
Text
General
Font Settings
Dropzone
Layout
Sizing
Spacing
Transitions

Show: on
State: Normal | Hover
Opacity: 100 %
Text Shadow: none
Family: body
Size: base
Weight: Mediu
Line Height: Norma
Letter Spacing: Norma
Case: None

Drop a Button on to a page and style it in the right sidebar.

look right, and those will be incorporated into your website automatically. Then, when you're ready to publish, Elements supports transfer by FTP, SFTP, FTPS and Amazon S3, and offers several useful options including consolidation of CSS files, and generation of a search engine sitemap. Realmac also provides Elements users with a handy 1GB of cloud storage at no additional cost to back up their projects.


Default Workspace
Publishing Setup
Classes
Contact
Details
FAQ
Contact Us
FAQ
ently Asked Questions
Reveal
Realmac Software v2
Global Overrides
Reveal
Trigger
Timing
Debug
Visualize animation start and end points.
Flexbox and Grid
Layout
Sizing
Spacing
Advanced
1024px (100%)

Mode: Smooth | Scrub
Animation: Fade
Distance: 20px
Play: Always on enter
Easing: Power1
Duration: 1000
Delay: 500 in milliseconds
Markers: off

Bundled effects like reveal are simple to add and control.

ACADEMY ASSISTANCE

Documentation is still in its early stages, with commendable detail provided for its API, needed for third-parties to develop add-ons. In other areas it's adequate but slightly lags the furious pace of its code development, with updates provided at least once a week.

As Elements starts to mature that should all catch up. Those online documents are supported by a growing Elements Academy of YouTube videos worth viewing before you decide whether to buy a licence. There's also a supported discussion forum.

RapidWeaver Elements is thoroughly well designed, has a surprisingly short learning curve, and should help even the novice web designer to create accessible and professional websites. While the annual subscription is relatively costly, if you're looking for a full suite of visual development tools, it should really be at the top of your list. ■

VERDICT

★★★★☆

Capable and versatile visual website editor that creates pro quality websites without writing code.

HOWARD OAKLEY

GROUP TEST

Microphones

A whole host of new streaming microphones are here, so it's time for Andy Edser to sort the sonic superstars from the aural nightmares.

SHURE
NZXT
RIG
SHURE

Should you wish to free yourself from a tinny headset mic, a good standalone microphone should be high on your shopping list. And I've got good news for you – gone are the days when a good recording setup meant XLR cables and complicated interfaces, as a simple USB connection is now all you need for excellent vocal capture at home.

So for those looking to raise your audio game, it's never been easier to capture excellent sound from the comfort of your home. But with so many microphone options on the market, which do you pick?

Nzxt Capsule Elite

Rich and fruity.

PRICE $156 **FROM** tinyurl.com/APC553nzxt

1 This Nzxt mic is sure to split opinions on first viewing. Some will find its design charming, while others (myself included) will think it looks a little too retro-chic. Still, what really matters here is the sound, and that's where the Capsule Elite excels.

The noise-rejection, for example, is superb. That's a quality inherent to the microphone itself, before you even get to the noise suppression options in the software. The large, 25mm capsule is also a bit of a stunner when it comes to audio quality, capturing rich, weighty tones befitting a much more expensive mic. It also comes with customisable rear lighting, some handy LED indicators on the front, and a stand that's more than capable of keeping upright under duress. It does strike a funny angle by default, though, and is more than a little fiddly to set up. Still, these are minor complaints, and if you can get over some of the design quirks, the Capsule Elite makes for an excellent mid-range choice.

VERDICT

Tonally superb and rejects noise like a champ, but its design may turn some people off.

SPECS Polar patterns: Cardioid; Connectivity: USB Type-C; Sample rate: Up to 192kHz, 24-bit; Frequency response: 50-20,000 Hz.

HyperX SoloCast 2

Clever customer.

PRICE $109 **FROM** tinyurl.com/APC553hyper

2 It might sound silly to say, but there's not a whole lot of innovation in budget microphone design these days. The HyperX SoloCast 2 has a party trick, though, and it comes in the form of a breech-like mechanism which opens to reveal a hidden stand integrated into its cylindrical frame.

Clever, that. It's also fully boom arm-mountable, with an adaptor hidden underneath, and comes with an integrated pop filter buried deep within its handsome metal grille for close-up vocal work. Which is where the SoloCast 2 likes it best. It's a great-sounding microphone when placed near to your lips, but a touch quiet at a distance, meaning you'll need to ramp up the gain in the HyperX Ngenuity software to make your vocals stand out. That'd be all well and good, but the included noise cancelling is a little light, making this mic prone to picking up unwanted noise. Still, it's a solid performer nonetheless, and very well-priced for what you receive.

VERDICT

A smart design and a solid budget performer, though it's a bit quiet at a distance.

SPECS Polar patterns: Cardioid; Connectivity: USB Type-C; Sample rate: Up to 96kHz 24-bit; Frequency response: 20-20,000 Hz.

4
SHURE
SHURE

If a podcast-ready sound is what you desire, the MV7+ is the microphone for you

Amazon USB Condenser Mic

Budget banger.

PRICE $26 **FROM** tinyurl.com/APC553amazon

3

I wouldn't blame you if you did a double-take at the price. The Amazon Basics mic is astonishingly cheap, so it's even more of a surprise when you open the plain brown box and discover a remarkably weighty, professional-feeling microphone.

There are more delights in store when you listen to the playback, too. While the Basics won't be winning any awards for its sound quality, it gets on with the job of capturing your vocals at a distance with aplomb. You don't get any extras, mind. Just a (rather short) cable and a slightly bizarre tilting stand, which ups the cute factor to near-unbearable levels for this tiny little mic.

You also get a mute button on the front, and… no, that's it for controls. And there's no fancy software to play with, either. The good news, however, is that the Amazon Basics unit is well-tuned out of the box, which makes it as straightforward to configure as it gets. Plug it in, get to recording, and count your saved dollars. Excellent.

VERDICT

Astonishingly cheap with great capture, but unsurprisingly light on features.

SPECS Polar patterns: Cardioid; Connectivity: USB Type-C to Type-A; Sample rate: 48kHz 16-bit; Frequency response: 50-20,000 Hz.

Shure MV7+ Podcast Microphone

Premium perfection.

PRICE $599 **FROM** tinyurl.com/APC553mv7

4

The Shure MV7+ is not for everyone. That's because it requires a (not included) boom arm to hold itself aloft, and works best from a close up position. It's a dynamic mic, which means it's not suited to recording from a distance, preferring instead to hug your face and pick up every single vocal detail.

And my goodness, it does it well. If a podcast-ready sound is what you desire, the MV7+ is the microphone for you. Like the MV6, it comes with software that's so good at its job, you simply need to tick all the options and leave it alone. It's been designed to make vocal capture easy, and immediately gets to work recording the warm, crispy details of your voice with the minimum of effort straight out of the box.

Speak within 12 inches of its substantial pop filter, and the MV7+ will reward you with a genuinely studio-like sound, which makes audio tweakers like me look shockingly redundant. It's expensive, I'll grant you – but worth every cent, if you ask me.

VERDICT

Professional sound, easy to configure, no included stand.

SPECS Polar patterns: Unidirectional (cardioid); Connectivity: USB Type-C/XLR; Sample rate: Up to 48kHz, 24-bit; Frequency response: 50-50,000 Hz.

5
SHURE
SHURE

6
RIG
M2 STREAMSTAR
RIG

MICROPHONE POLAR PATTERNS EXPLAINED

CARDIOID
This polar pattern captures a defined area of sound around the front of the mic, making it resistant to background noises and resulting in a dry, usable vocal signal.

SUPERCARDIOID
Supercardioid microphones capture a ‘bubble’ of sound at the front of the mic, while also picking up a small amount from the rear for added depth and ambience.

BI-DIRECTIONAL
A bi-directional pattern captures audio from both the front and the rear of the microphone, making it ideal for recording two speakers sitting either side of the capsule at once.

OMNIDIRECTIONAL
These microphones have the same sensitivity from all directions, making them great for capturing a whole room or multiple speakers at the same time.

Shure MV6

Big but brilliant.

PRICE $289 **FROM** tinyurl.com/APC553mv6

5 The Shure MV6 is large. Very large. This desktop-dominator might look like something you’d find on stage at your local venue, but that’s because it comes from one of the most respected brands in the recording industry with a long history of quality – and it shows off those credentials the second you plug it in.

The software is simple to use, reducing complicated settings like EQ and gain control down to single sliders. Far from being overly basic, though, the Shure mic instead gives off an air of confidence. It knows what it’s doing, even if you don’t.

Essentially, the MV6 is a set and forget desktop microphone with an impeccable pedigree, and those qualities come to the fore when you start recording. While it’s not perfect (the noise cancelling can be overly aggressive if left to its own devices), this mic is brilliant at capturing your vocals cleanly, yet with plenty of studio-like warmth. It also feels like it’ll survive the next apocalypse, never mind the next few years. Simply brilliant.

VERDICT
Superb desktop audio with simple software, though it is very large.

SPECS Polar patterns: Unidirectional (cardioid); Connectivity: USB Type-C; Sample rate: Up to 48kHz 24-bit; Frequency response: 20-20,000 Hz.

Nacon RIG M2 Streamstar

Fussy customer.

PRICE $180 **FROM** tinyurl.com/APC553nacon

6 While I’m a big proponent of the idea that USB microphones these days are simple to configure, there is the odd exception – and the Streamstar is exactly that. It’s a fiddly, fussy microphone to configure in a desktop position, and not exactly cheap when compared to its closest competition.

It’s not all bad, though. Stick the Streamstar on the end of a boom arm, bring it close to your laughing gear (I’m duty-bound to explain this is Australian for ‘mouth’) and it’s capable of capturing a decent tone, suitable for streaming or even a podcast.

On a desk, though, the Streamstar proves to be quiet at a distance, meaning you’ll need to crank the gain with the (somewhat flimsy) knob on the front. And without any noise cancelling software, it’s prone to capturing every tap, click, and breath noise you can think of. Given the price, it’s a shame that the Streamstar doesn’t meet expectations – and it’s simply outclassed by the rest of the competition here.

VERDICT
Good for close-up work. Noise prone, flimsy design.

SPECS Polar patterns: Cardioid; Connectivity: USB Type-C, 3.5mm aux, Bluetooth; Sample rate: Up to 192kHz, 24-bit; Frequency response: 20-20,000 Hz.

COULD THIS $170 PI RUN YOUR OFFICE?

Barry Collins spends a week working on a Raspberry Pi… and rather likes it.

The problem with writing for *APC* is you sometimes have to follow through on your own stupid ideas. So when, during a features meeting a few months ago, I idly speculated whether you could actually work full-time from a Raspberry Pi, the team unanimously and immediately agreed that it was a great idea and it was slotted into the schedule.

Consequently, I've just spent a week doing as much work as possible from a computer that cost less than the backup SSD connected to my Mac. You'll notice that "as much work as possible" caveat, because there are some jobs in my day-to-day existence – shuffling round magazine pages in InDesign and editing podcasts in Audition to name but two – that the Pi simply can't cope with. Not only in terms of raw power but also lack of access to the necessary software.

However, these are not everyday office tasks. Many workers these days spend 90% of their time in a web browser, or dealing with email, on video calls, or collaborating with colleagues in apps such as Teams or Slack. So could a Raspberry Pi that's perfectly capable of accessing all these services really be a passable office system? There was only way to find out.

The all-in-one approach

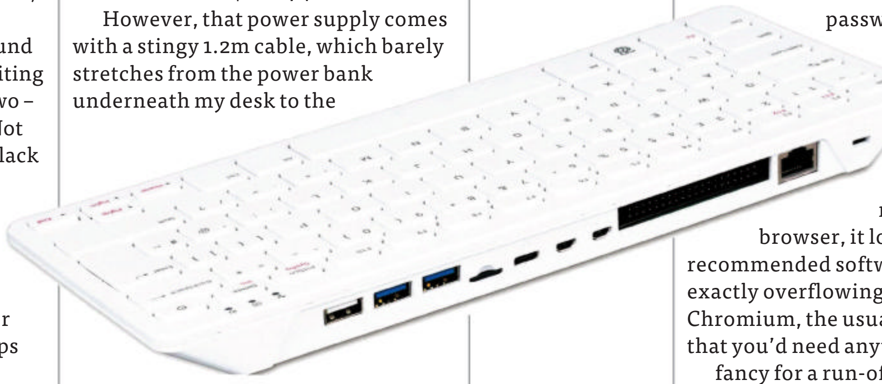
The Pi I selected for this daft little experiment was the Raspberry Pi 500 – basically a Raspberry Pi 5 wrapped in a keyboard enclosure, similar to the Commodore 64 of yore, albeit considerably slimmer. And without the power brick that gave bricks a bad name.

That's not to say the Raspberry Pi 500's own power supply is without its problems. The Raspberry Pi 500 doesn't come with a power supply, so I ordered the $25.37 official 27W offering along with a $12.37 micro-HDMI cable (a man can never have enough HDMI cables) from the Pi Australia, bringing the total cost of the hardware to $208.74.

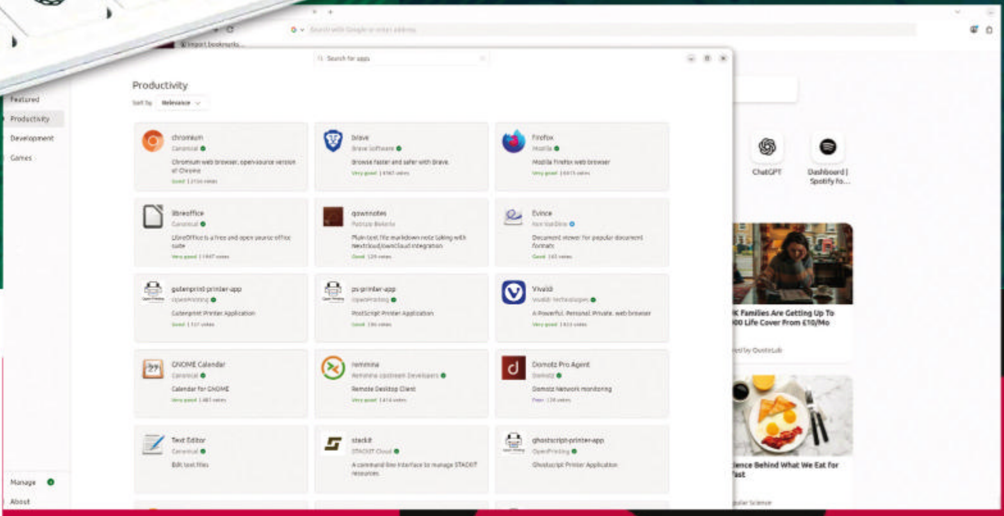
However, that power supply comes with a stingy 1.2m cable, which barely stretches from the power bank underneath my desk to the Pi sat on the desk itself. Indeed, for the first few minutes, I thought I'd been sent a duff unit, because the power cable was so stretched I'd managed to half pull the plug out of its socket. My suspicion is that for most office desk setups that power cable isn't long enough. You may wish to explore alternatives. You can't even replace the cable with a longer USB-C cable you may have to hand, because it's captive.

Once the power problems had been sorted, the setup could barely be simpler. The Pi 500 comes with a 32GB SD card pre-loaded with Raspberry Pi OS, so as soon as you've (properly) plugged it in and pressed the power button, it boots straight into the OS. Choose a password and you're away.

The Raspberry Pi OS is a pretty barebones OS. It bundles almost nothing but a browser, it looks dated and its recommended software store isn't exactly overflowing: LibreOffice, Chromium, the usual suspects. Not that you'd need anything particularly fancy for a run-of-the-mill office machine that's going to be doing a fair bit of its overall legwork just in the browser, but it wasn't making my heart sing either. I had to wonder –



RIGHT The Raspberry Pi 500 is a Raspberry Pi 5 in a keyboard enclosure.



LOWER YOUR STRESS LEVELS

surely there had to be a better alternative out there?

I've become a Linux Mint fanboy since installing it on a pensionable iMac in our kitchen. Given Mint's system requirements are so gentle that it could run on an overclocked Casio calculator, I thought it would be the ideal candidate for the Pi, but Mint doesn't officially support Arm processors.

I've always had a soft spot for Ubuntu and there's an official distribution of that for the Pi 500, too. Pottering around various online forums, most people seemed to recommend running Ubuntu from an SSD rather than an SD card to improve performance, so I used the Raspberry Pi imager to flash Ubuntu onto an old Samsung T7 SSD I happened to have lying around.

I popped out the microSD card containing Raspberry Pi OS so the poor lamb didn't get confused, changed the Pi's boot order to shoot from the SSD first and… nothing happened. Time out after time out, as the Pi 500 hunted in vain for a USB device to boot from. An hour of troubleshooting later, it appears that the T7 is just one of those external SSDs that the Pi simply doesn't rub along with. Apparently, forum folk tell me, the Pi is fussy about which SSDs it talks to, and my T7 was about as welcome as a trombonist in a string quartet.

> The Pi is fussy about which SSDs it talks to, and mine was as welcome as a trombonist in a string quartet

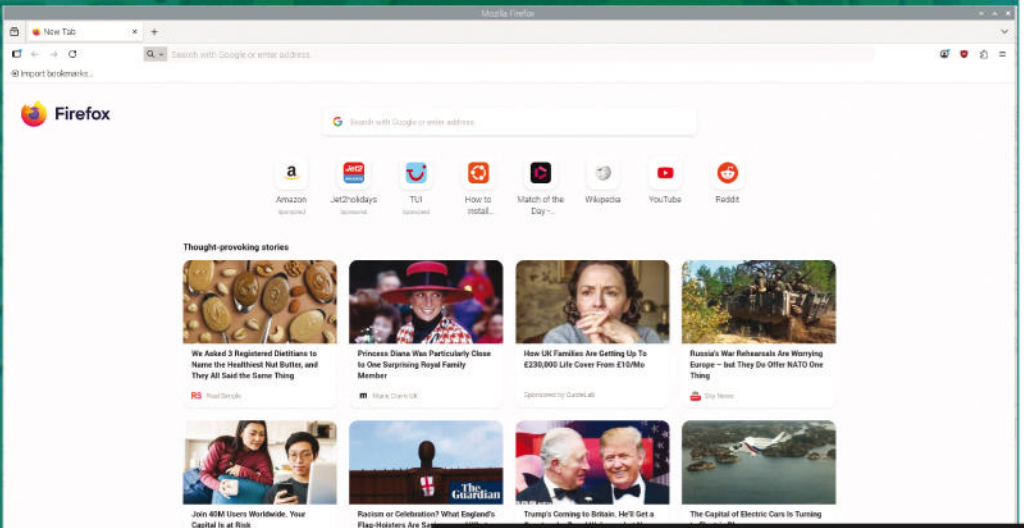
TOP The Ubuntu App Center is a well-stocked resource.

ABOVE The Pi 500 is plenty powerful enough for your everyday tasks.

New OS on the cards

Determined to get Ubuntu on to the PI one way or another, I bought a new 64GB microSD card, so that I could flash Ubuntu onto the fresh card without overwriting the Raspberry Pi OS, just in case something went wrong. For the accountants in the house, that sent my overall hardware bill soaring to $226.74.

This worked a treat, putting me in the much more familiar and comfortable environs of Ubuntu.



We Asked 3 Registered Dietitians to Name the Healthiest Nut Butter, and They All Said the Same Thing

Princess Diana Was Particularly Close to One Surprising Royal Family Member

How UK Families Are Getting Up To £230,000 Life Cover From £10/Mo

Russia's War Rehearsals Are Worrying Europe – but They Do Offer NATO One Thing

Join 40M Users Worldwide. Your Capital Is at Risk

The Ubuntu App Center contains my favourite browser, Vivaldi, so after the inevitable half hour of operating system updates, the browser was installed. Except when I entered my Vivaldi encryption password to synchronise all my bookmarks, history and other browser settings from my Mac installation of the browser, it immediately crashed. And did so again and again on the next couple of attempts. I realise a failure to sync my niche browser of choice is hardly a fatal hole for most people, but it registered as a definite pain in the neck for me. Back to Firefox we go.

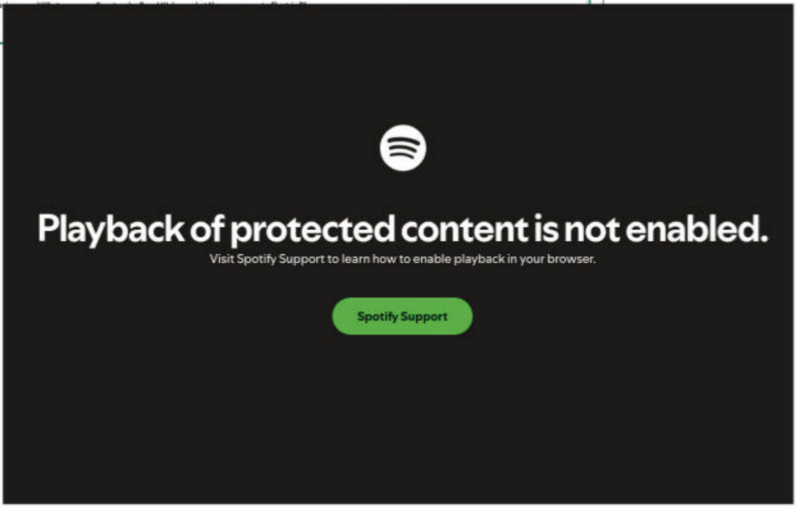
However, that's a mere minor irritation compared to the next problem off the rank: my Raspberry Pi 500's spacebar was oddly erratic. I first noticed it when I was setting up the PC, but when I started typing into a LibreOffice document it became all the more apparent. Sometimes a space wasn't registered at all and my words huddled together like nuns on the back of a bus; sometimes it was whacking an extra space in between words. I plugged my regular external keyboard (a Keychron C3 Pro, since you asked) into the back of the Pi and the problem was immediately resolved. But now I've got two keyboards on my desk, of course, which is hardly ideal.

I'm not the only one griping about the Pi 500's spacebar, either. A quick Google search reveals other owners have trouble with missing spaces, an issue reportedly acknowledged by staff in one Raspberry Pi Store, who advised one owner to press the spacebar plum in the middle because there's only one centrally placed switch beneath the actual key.

Getting the office ready

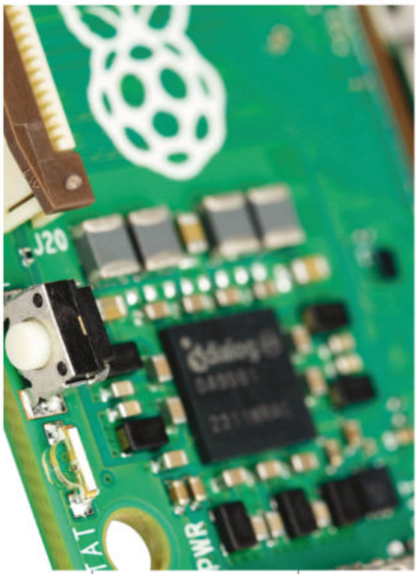
Now the hardware was largely working, it was time to start sorting out the software for my regular office duties. LibreOffice is pre-installed in Ubuntu and it's absolutely fine for 99% of what I need it to do. Professional Excel wranglers might still need the mothership – and, of course, there are browser-based versions of Excel available these days, albeit not with the full spectrum of features –but most office workers could easily get by with the tools in LibreOffice.

I hadn't used LibreOffice in quite a while, so I was pleasantly surprised to find that part of the setup routine now lets you choose from a variety of interfaces, one of which is a tribute act to the Ribbon interface found in Microsoft's Office apps. That made the transition even easier.



Playback of protected content is not enabled.

Visit Spotify Support to learn how to enable playback in your browser.



TOP The Raspberry Pi OS is pretty basic, but it does include a web browser.

MIDDLE Getting Spotify to play on the Pi proved an unconquerable challenge.

ABOVE As the Pi 5 is an Arm-based system, you'll need to check if a vital app will work on it.

The APC communications app of choice is Slack, and I was heartily relieved to find there's a Linux version of that in the Snap store (an app manager that works across various Linux distros). That relief didn't last long, however, when it became clear that the version of Slack in the store is designed for AMD64 processors, not Arm-based systems. In Slack's case it's not a total showstopper, as there's a web-based version of the software to fall back on. However, that's not always the case for other apps, so do your homework first if you're planning to switch to any Arm-based Linux distro.

Talking of Slack, one of the common ways in which we discuss what's going in the mag is via a Slack Huddle (poncey term for an ad hoc video call), but one of the drawbacks of relying on Slack's web client is that Huddles are disabled. Nevertheless, the team and I chatted away perfectly happily using Google Meet, with the Pi comfortably handling the video call gabbling away in one browser tab while I consulted Google Sheets containing the APC masterplan in another. The Pi happily accepted my Logitech USB webcam, the only drawback being that without Logitech's driver software, I was unable to correct the camera's tendency to underexpose subjects against a bright background, meaning my chat with Ben carried the unwelcome air of a hostage video.

Email-wise, Thunderbird comes pre-installed with Ubuntu and is... fine. I've never massively warmed to Thunderbird, always feeling it lagged about five years behind the curve. For example, there's no easy way to create a unified inbox, where all new messages from your various email accounts appear. There's an eight-step guide to creating one on Mozilla's help pages, but in most mail clients these days it's a simple option you switch on. Nevertheless, Thunderbird will do for most people, especially if you're only using the single inbox. And many people will be using webmail services such as Gmail anyway, where the facilities on offer in the web version probably outstrip anything a desktop client will offer.

The one other office essential is, of course, Spotify. If I'm proofing *my* writing, I need swooning classical symphonies or 'Kylie Minogue's Greatest Hits' to focus the mind. Alas, getting Spotify to play on the Pi proved an unconquerable challenge. There was no app in the Ubuntu store (another victim of the AMD64/Arm thing) so I resorted to the web

A FRESH SLICE OF PI

Just as we put the finishing touches to this feature, the buggers announced a successor to the Raspberry Pi 500 that I've used here. The good news? It (theoretically, at least) deals with two of the biggest problems I experienced when using the Pi 500 as my office driver.

The first improvement is the keyboard. The new Raspberry Pi 500+ has a mechanical keyboard, which should deal with the erratic spacebar and other issues I had with the chiclet design on the 500. Each of the keys on the 500+ "rests on a Gateron KS-33 Blue switch with a custom RAL 7001 Silver Grey stem, giving a satisfying sound and feel when pressed", according to the company, and each of those keycaps is replaceable if you don't like how they look or feel. It even has individually addressable RGB lighting!

The other huge improvement is the addition of a built-in 256GB SSD. This should make a big difference to performance, helping websites to load more snappily and eradicate those little brain farts that made working on the Pi 500+ occasionally frustrating. It's easily upgradable, too, with the M.2 slot accessible with a provided tool.

The downside is the cost. The new Raspberry Pi 500+ costs $335, which is essentially double the price of the 500. Nevertheless, in the grand scale of things, it still remains remarkably cheap for what should be a very competent office desktop. I can't wait to get my hands on one.

ABOVE The new Raspberry Pi 500+ has an improved mechanical keyboard.

The Raspberry Pi 500's graphical prowess is impressive for a sub-$200 device

player, but hit a brick wall here, too. "Playback of protected content is not enabled," read the huge message splashed across the screen, with links to Spotify's support pages offering guides on how to unlock the DRM facility in various browsers. Alas, the instructions for Firefox proved incorrect – again, I suspect because Spotify is expecting you to run the AMD64 version of Ubuntu. Even a third-party app that promised access, called spotify-qt, seemed to be snagged by a recent change to Spotify's developer settings, which no longer allows localhost to be used as the web Uniform Resource Identifier to access the service.

AI on the Pi

Of course, we can't write anything in *PC Pro* these days without dropping a few coins into the AI fountain.

The Raspberry Pi 500's graphical prowess is impressive for a sub-£100 device. It had no problem running smoothly on my 34in 3,440 x 1,440 widescreen monitor, and it's perfectly capable of streaming 4K footage without stutter. It's not, however, an AI powerhouse. Nobody in their right mind is running Stable Diffusion or any local LLMs on this thing.

However, that's not the way the vast majority of people interact with AI anyway. Most rely on cloud services such as ChatGPT or Google Gemini, which are easily accessible through the browser. And because they're cloud services, they're no slower on the reasonably limited Pi than they are on a $3,000 ThinkPad. The only thing the Pi can't do is run the ChatGPT app locally, so features such as getting it to watch over what you're bashing into VSCode are out. Again, however, not typical office duties.

The AI services also come in handy for dealing with some of the unfamiliarities of running on Pi hardware. When I was trying to find out how to change the boot order from SD card to SSD, for example, it was Google Gemini that supplied the necessary code snippets for the terminal. If you did decide to roll out Pi hardware, the AI services could be a great help in navigating around alien operating systems.

The pi-fect office PC?

Can you use a Raspberry Pi 500 as an everyday office PC? Yes, you probably can, with a sizeable asterisk on that statement. I spent a week working on and off with it, mainly for word processing, but for plenty of other little jobs as well, and it held up.

It's always hard comparing something like the Pi to the MacBook Pro that's my daily driver, because of course the experience is going to be worse. Websites don't open in a snap, things get a bit sticky if you've got more than three or four apps open, it sometimes pauses to think. Perhaps the most annoying part of working with the Pi was the micro-brain farts that regularly occurred, sometimes resulting in a dropped keystroke. They weren't a showstopper, but having to go back to correct words occasionally was an unwanted pain. It could be that installing the OS on a compatible SSD rather than a SD card would solve that, but then you're bumping up the price, too.

And while we're talking of skipped letters, I'm not convinced the Pi 500 and its iffy spacebar is the ideal Pi hardware for the job. Far better to go with a Pi 5, a decent enclosure and your own keyboard – or the Pi 500+ (*see above left for more about that*). Don't forget to budget for a longer power cord if your plugs aren't close, too. Or, more practically, power the Pi from a monitor.

If you've got an office role where users spend the vast chunk of their day in the web browser, dealing with email and shuffling documents around, a little slice of Pi could well be a strong option. Even in the home, it could certainly serve a purpose as a homework terminal for the kids, with the added advantage of it not being easy for the little brats to install *Minecraft* or other distractions on it.

All told, you do get an awful lot of computer for $170 these days. ■

Electric air dusters

From canned air to electric dusters — Lindsay Handmer presents a practical guide.

If you build and maintain your own computers, over the years you have probably gone through a small mountain of canned air. It's great at shifting hard-to-reach debris, but as we all know, dust always comes back and the cost adds up.

Electric air dusters trade the disposable can for a compact electric blower that you can recharge and reuse. It doesn't fully replace canned air, but it can dramatically cut usage. For computing enthusiasts of all types, they are an easy way to keep heatsinks, fans and filters clear without canned air or a bulkier workshop blower or compressor. For home office users they turn cleaning keyboards, docks and cluttered desks into a quick (and let's be honest, fun) job rather than a maintenance chore.

Of course, there are still trade-offs to think about. Electric dusters are not universally more powerful than a good canned air burst, and it's hard to beat the crevice cleaning power of a skinny straw attachment. Electric dusters are not all made equal, and while some are great, others are cheap junk or use cells that will wear out rapidly.

But a powerful electric air duster is a very handy tool, so in this guide we will run through where they do best, how to dodge the junk and then test three Wolfbox models we love: the entry level MF50, the everyday powerful MF100 and the mighty if I strap wings to it, it might fly MF200.

These devices are seriously versatile – not just for PCs!

BELOW Getting the dust off fan blades can dramatically increase performance.

ABOVE Make your keyboard as-new again.

BELOW And just look at how happy puppy is!

ELECTRIC AIR DUSTER 101

At its core an electric air duster is a small, handheld blower that uses a powerful electric motor and ducted fan (much like what you get in RC aircraft) to pull air in on one side and fire it out a nozzle on the other at high velocity. The result is the same basic idea as canned air – a focused blast of air that shifts dust out of gaps – but you can use it over and over, as well as for extended periods.

Most air dusters are either corded plug-in models that prioritise sustained power, or cordless battery powered units. In contrast, compressors or centrifugal blowers are great for workshops but they are bigger, heavier and usually need to be used somewhere your computer isn't.

Canned air costs about $10 and gives 5 to 10 minutes of total cleaning. A quality air duster starts from about $50, so breakeven time depends on how much you use it. But considering how many uses they are good for beyond what canned air can handle, it's a worthy investment.

WHERE ELECTRIC AIR DUSTERS SHINE IN EVERYDAY USE

The obvious place to start is inside a desktop PC, as over time dust settles onto the surfaces of heatsinks, fan blades and filters, and eventually becomes quite hard to shift. Regular blasts directed at the CPU cooler, GPU, intake filters and PSU vents help clear settled dust before it bakes on, which in turn improves airflow and helps keep temps in check. The same is true for laptops – just blow air into the out vent to dislodge dust back the way it came in, and do a quick burst to avoid overspinning the fan.

A clogged heatsink is often most obvious at idle, leaving the CPU fan still screaming, whereas under load, your processor throttles from the heat and that once snappy spreadsheet takes minutes to open.

Even the most fastidious owner's keyboard is a mess of crumbs and grit under the keycaps. A duster with a narrow nozzle makes it easy to sweep along the rows of keys, clear USB and HDMI ports, or blow dust out of console vents without opening anything.

With a powerful electric air duster in hand, suddenly everything around the house starts looking a little dusty. Bags with that bit of sand that never quite comes out, kitchen appliances with hairballs in hard to access mechanisms and window tracks full of who knows what. A quick blast with an air duster makes short work of such problem areas, but watch for the blowback unless you want a face full of dead bugs. Now, it's not a replacement for a vacuum, but it does a good job of getting debris out of the tight spots the vacuum suction never quite reaches.

The more powerful air duster models also earn their keep in cars and garages. You can clear dust and sand from cup holders and off floor mats, get your dash clean without wiping, blow debris out around door seals, and finally unseat that spider living inside your wing mirror. They can also do a passable job of cleaning debris off a small balcony or patio.

From there, uses only get more creative. A long blast under a shirt during a sweaty hike is a remarkably effective way to cool down. And turning a reluctant backyard fire pit into an almost call to the fire brigade has never been easier.

THE KEY SPECS THAT ACTUALLY MATTER

When you start looking at air dusters, the spec sheets can feel like a race to the biggest number. Motor speed in RPM is touted front and centre, but it does not mean much by itself. Wind speed is useful, but it's usually a peak with a specific nozzle. Airflow (cubic feet per minute) is another metric that doesn't tell you how much actual force (and thus cleaning dust power) the unit has.

Run times are good for lower settings, but at maximum power, they can be misleading. 10 minutes on max does not mean 10 minutes at the same maximum output – you get 30 seconds or so of highest output, before voltage sag in the batteries drops performance. Bigger milliamp hour numbers for battery capacity look good, but it does not mean the cells give that rating on the max setting.

Still, these numbers make for a starting comparison point, as long as the brand is honest. But to get rid of some of the guesswork, in our reviews we use an anemometer to directly measure the airspeed, as well as log the force generated.

HOW TO AVOID LOW QUALITY ELECTRIC AIR DUSTERS

Buying an air duster online is a bit like it used to be when shopping for an affordable power supply. There are some excellent units, but there are also a lot of rebadged specials with numbers that only exist in someone's imagination.

The red flags are easy enough to spot: absurd RPM claims, missing or implausible battery capacity, hours-long runtimes at max and airflow figures that would put a tropical cyclone to shame.

Really though, if you are shopping on AliExpress, your local market, or anywhere without a returns policy, unknown brands are best avoided. Amazon (for all its faults) is slightly better thanks to an actual returns policy, but really the best bet is to buy from a known brand with real reviews.

Now, you might be forgiven for thinking Wolfbox sounds like a sketchy name, but it's actually one of the more reputable options available.

WOLFBOX AT A GLANCE

Wolfbox might not be a brand you are familiar with, but the company is better known for its dash cams and other in-car gadgets and has been operating long enough (6 years) that we are confident they aren't going to disappear.

In the MF lineup, the MF50 is the compact cordless all-rounder for light to moderate cleaning, the MF100 steps up the airflow for people with more gear to look after, and the MF200 is the heavy hitter with a removable battery for longer or tougher jobs.

So how do they actually stack up in real world use?

apc
HIGHLY RECOMMENDED

PRICE $50 **WEB** au.wolfbox.com

Wolfbox MF50

The baby wolf.

The MF50 is the affordable Wolfbox duster, with a street price that often dips under $50. It's pocket sized, weighs 200 grams, has three speeds and four different nozzles. Airflow specs are light, and Wolfbox claims up to 110,000 RPM. It has a built-in 5,000mAh battery and USB-C charging.

Despite being the smallest option, it's powerful, noisy and fun, and does a great job at cleaning dust and debris in close quarters. It shifts most, but not all, baked on dust on a CPU heatsink. While it will happily blow a desk or bench clear, it's not as good at bulk or distance cleaning as the bigger units.

Wolfbox rated it for the following runtimes: low: 240 mins, medium: 36 mins, high: 19 mins. In testing, we saw Low: 213 mins, medium: 33 mins, high: 16 mins. That's not too bad, but notably the output on high is around the same as on medium by the end of the 16 minutes.

There isn't a rated airspeed, but we measured 19.49 m/s on high, 11.25 m/s on medium and 4.3 m/s on low. And force (in newtons) of 1 N on high, 0.37 N on medium and 0.05 N on low. Read our comparison between models for more info, but these are good results.

VERDICT

★★★★☆

Budget friendly yet powerful and useful every day.

SPECS 110,000 RPM brushless motor (3 speed); 5,000 mAh battery, rated runtime: 240 min low / 19 min high; USB-C, 3.5 h charge; 4 nozzles; 8.6 x 8.6 x 13.0 cm; 204 g.

WOLFBOX
apc
EDITOR'S CHOICE

PRICE $100 **WEB** au.wolfbox.com

Wolfbox MF100

Versatile enough for loads of jobs.

The MF100 is a popular air duster and often can be found for under $100. While chunkier than the MF50, it is easy to slip into a pocket or bag, but has significantly higher performance. Wolfbox rates it for 45 m/s (~162 km/h) airspeed, 10 minutes runtime on high (medium is not rated and low: 100 minutes), a 6,000 mAh built in battery and a weight of 300 grams.

In real world use it has a serious amount of power, with a noticeable kick from the thrust when set to high. It ran for 10 minutes, 24 seconds on high, while medium was 17 minutes, and low made it 101 minutes – bang on spec.

The rated max airspeed is 45 m/s, but we measured 23.29 m/s. This isn't a surprise, as with different testing procedures, nozzle use etc we can't directly compare them and our measured speed is for comparing between Wolfbox models.

In terms of cleaning, the MF100 is a noticeable step up from the MF50 and will shift stuck debris the smaller duster can't. The higher speed jet of air also travels further, so it's better for broader use, like clearing up a workbench or cleaning out the car. It's also excellent for blowing up pool and beach toys, or filling an air mattress.

VERDICT

★★★★½

A great allrounder option that handles everything from cleaning out your electronics, to helping in the garage or when camping.

SPECS 150,000 RPM brushless motor (3 speed), max 45 m/s; 6,000 mAh battery, rated runtime: 100 min low / 10 min high; USB-C, 2.5 h charge; 5 nozzles + 2 brushes; 16 x 4 x 6 cm; 300 g.

WOLFBOX
apc
HIGHLY RECOMMENDED

PRICE $200 **WEB** au.wolfbox.com

Wolfbox MF200

A wolf in wolf's clothing.

The MF200 is the newly launched flagship of the Wolfbox range, and is bigger and more powerful than the MF100 or MF50. It also uses a removable 6,000 mAh battery, so you can swap it for prolonged use, or replace it in the future if wear drops the capacity too low. Of course, this all comes at a cost: the MF200 is close to $200, and spare batteries cost $60.

The MF200 uses the same three speed setup as the smaller models, just with a larger, more powerful motor. Wolfbox rates it at up to 85 m/s airflow, but in testing we saw only 30 m/s. That is a huge difference, but not actually an issue in terms of how it performs or compares to the other MF models.

It's rated for the same 10 minutes on high runtime as the MF100, and happily does so, lasting 10 minutes, 32 seconds. Note however that by the end it's performing at a similar level to the medium setting due to (an expected) voltage sag.

The extra airspeed and increased force combine to give the MF200 a very noticeable amount of extra dusting power over the MF50 or MF100. It cleaned stuck on debris out of a filter that the others couldn't shift, and the stream of air travels far and fast enough to quite effectively move leaves outdoors.

VERDICT

★★★★☆

Supremely powerful and a very effective electric blower for anyone happy to pay for portability.

LINDSAY HANDMER

SPECS 110,000 RPM brushless motor (3 speed), max 85 m/s (306 km/h); 6,000 mAh removable battery, rated runtime: 100 min low / 10 min high; USB-C, 2.5 h charge; 4 nozzles + 2 brushes; 9.7 x 9.7 x 17.8 cm; 380 g.

Wolfbox MF50 vs MF100 vs MF200: performance comparison and which should you choose.

While the airspeed and force from the MF50, to the MF100 and then the MF200 increases in a linear fashion, the result of this is not quite as intuitive. All three actually shift around a fairly similar amount of air overall. Just the more powerful air dusters are moving that same volume a lot faster, which takes a lot more energy.

Our results are only useful to compare the Wolfbox models, not alternative air dusters (due to different test setups), but they do let us calculate some extra figures and make a deeper comparison of the performance differences.

For example, the MF200 shifting 46 l/s of air at 30 m/s has 140% more kinetic energy in that airstream, vs the MF50 moving 43 l/s of air at 20 m/s. So over twice as much energy to impart (and move) debris, making it much better at clearing a larger area. The airflow from the MF200 also has about 125% higher dynamic pressure, which is the "punch" of how hard the air hits, making it better at dislodging stuck on debris.

While the MF200 is a fantastic air duster and the heavy hitter for deep cleans, longer sessions and yard or camping duties, it's (delightful) overkill for everyday dust clearing duties on the likes of computers and keyboards. The MF50 is the ideal choice for lighter but effective cleaning of electronics and it gives excellent bang for buck. At double the price, the MF100 is better for tougher dusting jobs and suits a wider variety of tasks, like helping with cleaning car interiors or use in the garage.

Our pick of the bunch is the MF100 – especially when under $100. All three are sold directly from Wolfbox, but we find the best prices are almost always from Amazon.

Spec	Wolfbox MF50	Wolfbox MF100	Wolfbox MF200
Motor type / max RPM	Brushless, up to 110,000 RPM (3-speed)	Brushless, up to 150,000 RPM (3-speed)	Brushless, up to 110,000 RPM (3-speed)
Claimed max airspeed	Not specified	Max 45 m/s	Max 85 m/s (306 km/h)
Battery capacity / type	5,000 mAh built-in Li-ion	6,000 mAh built-in Li-ion	6,000 mAh removable pack, 22.2 Wh (7.4 V)
Spec runtime (low–high)	240 min (low) to 19 min (high)	100 min (low) to 10 min (high)	100 min (low) to 10 min (high)
Charging	USB-C, 3.5 h full charge	USB-C, 2.5 h full charge	USB-C, 2.5 h full charge
Weight	204 g	300 g	380 g
Nozzles / brushes	4 nozzles, no brushes	5 nozzles + 2 brushes	4 nozzles + 2 brushes
Dimensions (approx)	8.6 × 8.6 × 13.0 cm	16 × 4 × 6 cm	9.7 × 9.7 × 17.8 cm
Test results	MF50		
Runtime High	15:56	10:24	10:32
Runtime Medium	33:24	17:21	19:45
Runtime Low	212:11	101:14	99:12
Airspeed m/s			
High	19.49	23.29	29.26
Medium	11.25	15.57	16.37
Low	4.3	7.8	7.88
Thrust grams			
High	102	131	165
Medium	38	62	61
Low	5	15	16
Calculated figures for High settting (max, theoretical)			
Force (N)	1	1.3	1.6
Dynamic pressure (Pa)	228	325	514
Flow (L/s)	43	46	46
Flow (CFM)	91	98	98
Jet power (W)	20	30	47

WHAT'S NEW IN MICROSOFT WORD

The world's best-known word processor just keeps on gaining new capabilities. **Nik Rawlinson** checks out the latest features you might have missed.

Most of us don't ask much from a word processor. It's been suggested that the original release of Word for Windows back in 1989 did everything most people need, so you might well wonder how Microsoft can possibly keep evolving the app in ways that are useful enough to justify a rolling subscription.

Yet recent releases have brought some significant updates – and if you haven't noticed them, that's because Microsoft has taken the respectable approach of keeping most of them out of your way, unless you specifically call on them.

As you surely know, Word is part of Microsoft 365, available as a monthly or annual subscription. Pricing for home users starts at $159 per year for a single user, $179 for a family of up to six. That's a price rise compared to last year, but it now includes AI-powered Copilot features. If you want the suite without Copilot, you can downgrade your subscription – and claim a partial rebate – via the instructions at **tinyurl.com/APC553downgrade**.

Just released last month, there's also a new option called Microsoft 365 Premium. For $33 a month, or $329 a year, this gets you the full set of AI features, with the highest usage limits. That includes Copilot Chat, which is based on ChatGPT – so if you're currently paying a separate $30 a month rate for ChatGPT Plus, Microsoft 365 Premium could be a much more cost-effective option, especially since one subscription covers up to six users.

For businesses, Copilot is an add-on to existing Microsoft 365 or Office 365 plans, costing $44.90 per user per month on top of the standard licence.

If you'd like to try before you buy, there's a free one-month trial (see **tinyurl.com/APC553trial**). Be warned, however, that this is available only for the Family bundle, so if you're interested in a Personal licence, be sure to cancel the auto-renewal before the trial period expires.

The other way to get the productivity suite without Copilot is to buy an Office 2024 licence for a one-off cost of $219. However, as well as lacking the integrated AI tools, this doesn't come with Outlook or the Clipchamp video editor, it won't get any new feature updates, and it also doesn't include the 1TB of OneDrive storage that's bundled in as a perk for 365 subscribers.

COPILOT AI

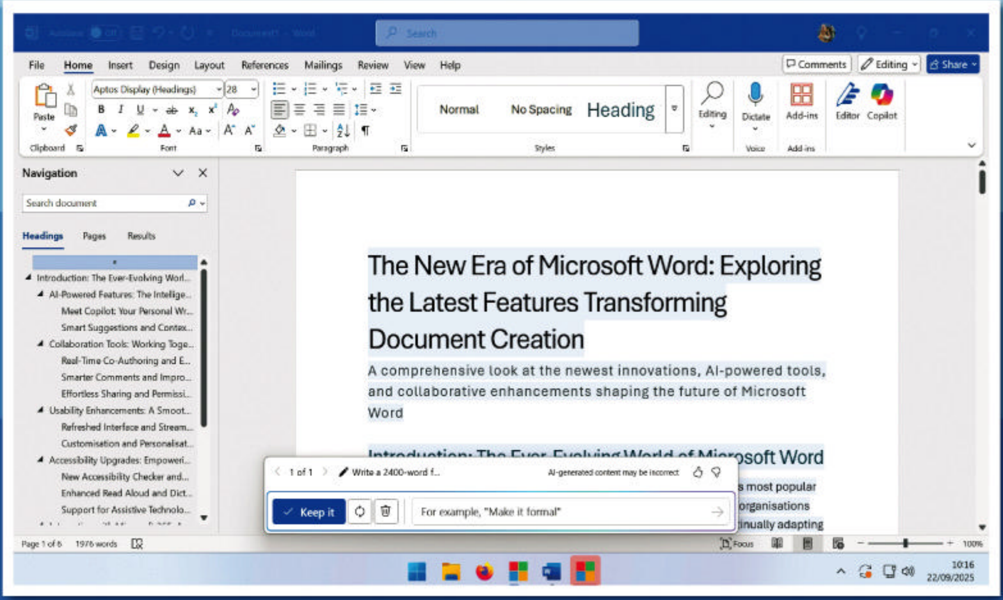
Without a doubt, Copilot is the biggest feature added to Word in recent years. The AI assistant is based on ChatGPT, so it benefits from the ongoing development of that platform. This includes the recent GPT-5 engine, but Word automatically selects between different AI engines to provide speedy responses for simple, straightforward requests, and deeper reasoning for more complex, open-ended questions. To test-drive it for yourself, look for the "Try GPT-5" button at the top right of the Copilot Chat window.

One of Copilot's most impressive abilities is generating complete documents out of thin air. We asked it to draft a 2,400-word document outlining the latest additions to Microsoft Word (not the one you're reading now, to be clear), and in less than a minute it had produced a well-structured essay, with headings for easy navigation.

Tha AI is also great at refining text. We asked it to rewrite the feature, this time devoting at least half of the word count to criticisms of Word, and of Microsoft 365 in general. This time the finished product came out a little short, but it would make a superb starting point for a purchasing brief.

Even though you're paying for the subscription, this type of AI usage isn't unlimited. Standard home and family

WITHOUT A DOUBT, COPILOT IS THE BIGGEST FEATURE TO BE ADDED TO WORD IN RECENT YEARS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AI-Powered Features: The Intellige...
Meet Copilot: Your Personal Wr...
Smart Suggestions and Contex...
Collaboration Tools: Working Toge...
Real-Time Co-Authoring and E...
Smarter Comments and Impro...
Effortless Sharing and Permissi...
Usability Enhancements: A Smoot...
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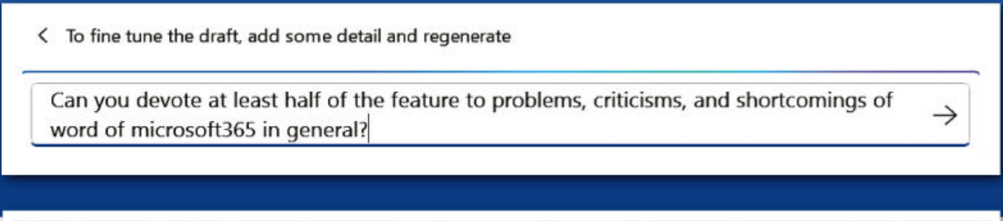
22/09/2025

The New Era of Microsoft Word: Exploring the Latest Features Transforming Document Creation

A comprehensive look at the newest innovations, AI-powered tools, and collaborative enhancements shaping the future of Microsoft Word

Introduction: The Ever-Evolving World of Microsoft Word

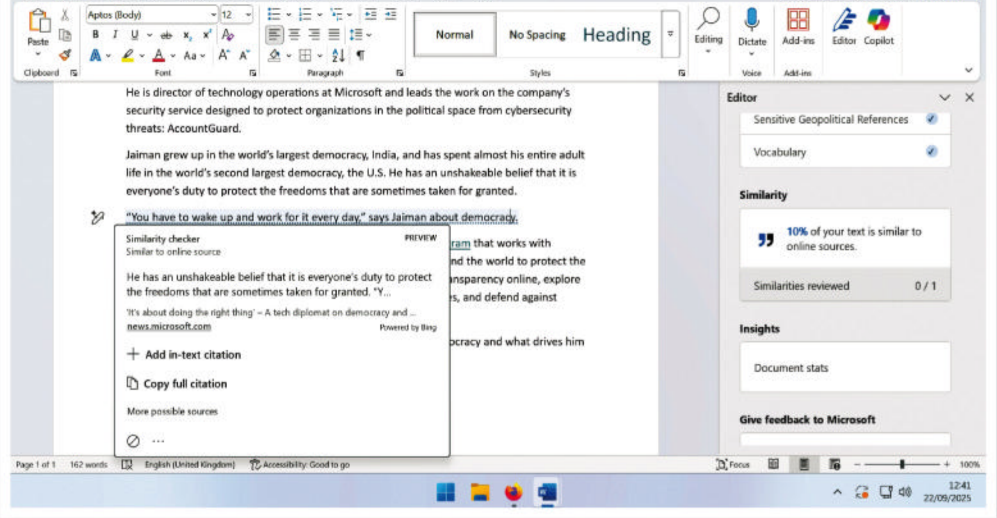
LEFT Copilot wrote a long, detailed report for us in less than a minute.



To fine tune the draft, add some detail and regenerate

Can you devote at least half of the feature to problems, criticisms, and shortcomings of word of microsoft365 in general?

LEFT Copilot prompts can use previous results as a starting point for further work.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Insights
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Give feedback to Microsoft
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Add in-text citation
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More possible sources
Page 1 of 1
162 words
English (United Kingdom)
Accessibility: Good to go
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22/09/2025

He is director of technology operations at Microsoft and leads the work on the company's security service designed to protect organizations in the political space from cybersecurity threats: AccountGuard.

Jaiman grew up in the world's largest democracy, India, and has spent almost his entire adult life in the world's second largest democracy, the U.S. He has an unshakeable belief that it is everyone's duty to protect the freedoms that are sometimes taken for granted.

"You have to wake up and work for it every day," says Jaiman about democracy.

He has an unshakeable belief that it is everyone's duty to protect the freedoms that are sometimes taken for granted. "Y...

'It's about doing the right thing' – A tech diplomat on democracy and ...
news.microsoft.com

10% of your text is similar to online sources.

ABOVE Microsoft Editor's similarity checker can check for plagiarism and add citations.

users get 60 AI credits per month, renewing on the first of each month. These "credits" are nebulously defined, with complex tasks using more credits than simple ones; after creating our second draft, we checked our balance and saw that we had 56 AI credits remaining, for example. This represents two major AI actions – the original draft, and the rewrite. Credits are shared across AI-enabled applications, including Word, Excel, PowerPoint and Outlook.

If you don't want to use Copilot, you can turn it off. Click File followed by Options, then click Copilot in the sidebar. Untick the box beside Enable Copilot.

MICROSOFT EDITOR

You can access Microsoft Editor for free in your browser (see **tinyurl.com/APC553editor**), but it also appears directly in the Word sidebar, where it rates your document for clarity, checks the spelling and grammar, and gives an overall Editor Score. The closer you get to 100, the better. If you're using Microsoft 365 you've probably come across this feature already – although you might not always agree with its suggestions, particularly if you have a house style you need to follow.

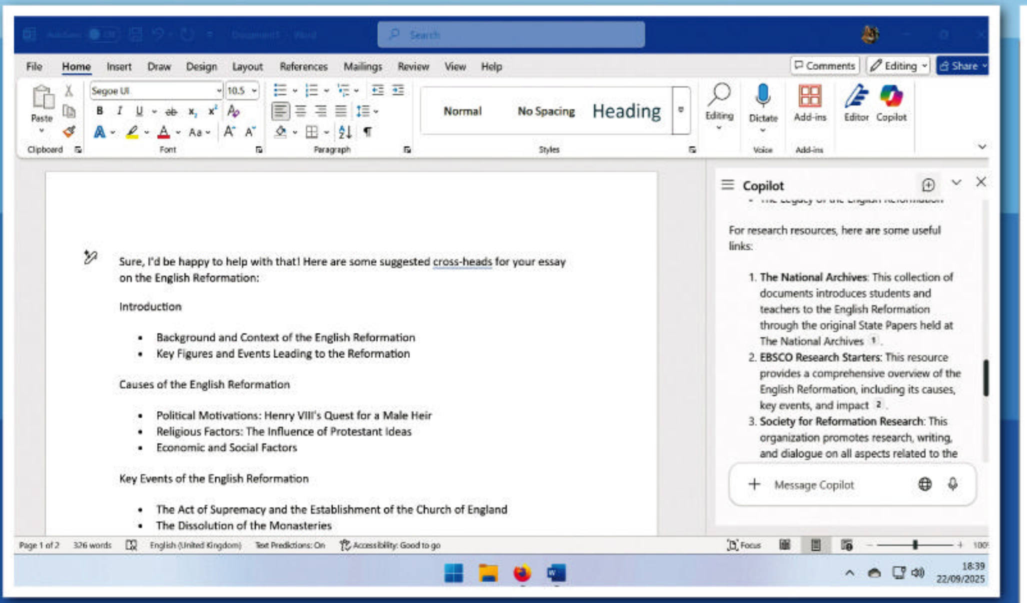
One other very valuable feature of Editor is the similarity checker. This compares the content of your file to online sources in an attempt to detect plagiarism, or to help you find original sources and give them due credit.

We tested this by pasting the opening paragraphs of some Microsoft press releases into our documents, and watched as it promptly identified the source of content originally published four years ago. More impressively, it repeated the trick even when we replaced the content with text that was just over two weeks old. The AI gave us the option of adding an in-text citation, which turned the text into a hyperlink to the original document, or copying the full citation to the clipboard, from which we could insert it into a footnote, endnote or bibliography, or include it within the flowing text.

There's one further useful editing feature, just added last month, though for now it works only in the Word web app, and only for documents written in English. Select a section of your text – or your entire document – and click the pen icon in the left margin, then select "Fix spelling and grammar". Word immediately suggests edits; you can choose to "Keep all" of them, or "Undo all" to return the text to its previous state. To roll back individual corrections, hover over the applicable phrase or word you want to recover and click Undo.

RESEARCH ASSISTANT

As well as powering Microsoft Editor, the Copilot sidebar can act as a writing companion, suggesting content and even performing research on your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Comments
Editing
Share
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Paragraph
Normal
No Spacing
Heading
Styles
Editing
Dictate
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Editor
Copilot
Copilot
Message Copilot
Page 1 of 2
326 words
English (United Kingdom)
Text Predictions: On
Accessibility: Good to go
Focus
18:39
22/09/2025

Sure, I'd be happy to help with that! Here are some suggested cross-heads for your essay on the English Reformation:

Introduction

- Background and Context of the English Reformation
- Key Figures and Events Leading to the Reformation

Causes of the English Reformation

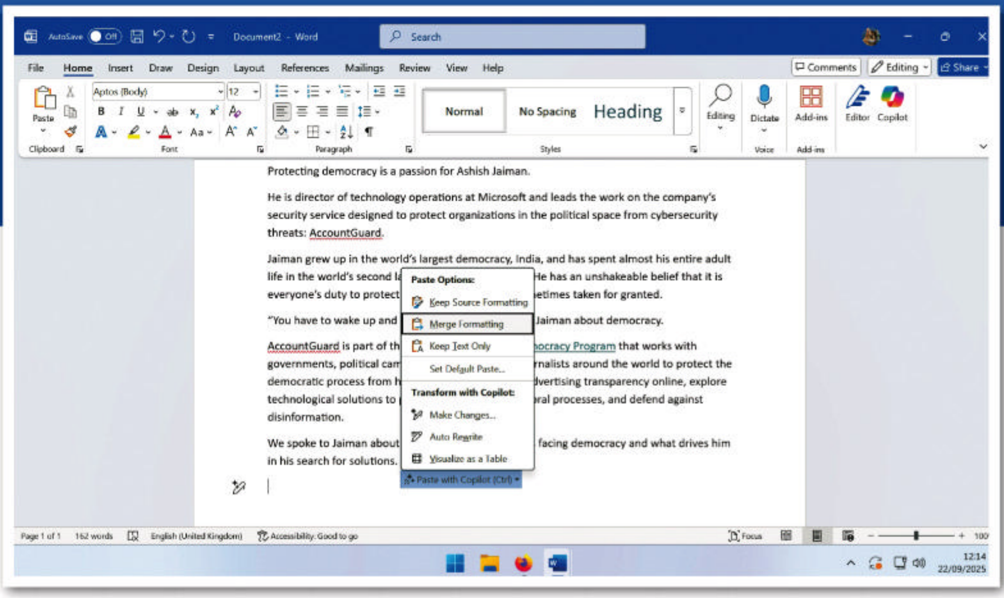
- Political Motivations: Henry VIII's Quest for a Male Heir
- Religious Factors: The Influence of Protestant Ideas
- Economic and Social Factors

Key Events of the English Reformation

- The Act of Supremacy and the Establishment of the Church of England
- The Dissolution of the Monasteries

For research resources, here are some useful links:

1. **The National Archives**: This collection of documents introduces students and teachers to the English Reformation through the original State Papers held at The National Archives 1 .
2. **EBSCO Research Starters**: This resource provides a comprehensive overview of the English Reformation, including its causes, key events, and impact 2 .
3. **Society for Reformation Research**: This organization promotes research, writing, and dialogue on all aspects related to the


AutoSave
Off
Document2 - Word
Search
File
Home
Insert
Draw
Design
Layout
References
Mailings
Review
View
Help
Comments
Editing
Share
Paste
Clipboard
Aptos (Body)
12
Font
Paragraph
Normal
No Spacing
Heading
Styles
Editing
Dictate
Voice
Add-ins
Editor
Copilot
Paste Options:
Keep Source Formatting
Merge Formatting
Keep Text Only
Set Default Paste...
Transform with Copilot:
Make Changes...
Auto Rewrite
Visualize as a Table
Paste with Copilot (Ctrl)
Page 1 of 1
162 words
English (United Kingdom)
Accessibility: Good to go
Focus
12:14
22/09/2025

Protecting democracy is a passion for Ashish Jaiman.

He is director of technology operations at Microsoft and leads the work on the company's security service designed to protect organizations in the political space from cybersecurity threats: AccountGuard.

Jaiman grew up in the world's largest democracy, India, and has spent almost his entire adult life in the world's second la … He has an unshakeable belief that it is everyone's duty to protect … etimes taken for granted.

"You have to wake up and … Jaiman about democracy.

AccountGuard is part of th … ocracy Program that works with governments, political cam … rnalists around the world to protect the democratic process from h … dvertising transparency online, explore technological solutions to … ral processes, and defend against disinformation.

We spoke to Jaiman about … facing democracy and what drives him in his search for solutions.

behalf. We tried it out by asking it to populate a new document with cross-headings and provide research links for an essay on the English Reformation. Its suggestions were impressively comprehensive, covering Henry VIII's desire for a male heir, Anne Boleyn's role and the break with Rome. The links it provided took us to a variety of sources, including the National Archives, and we were pleased to find that clicking the reference number beside each one opened it in our default browser (Firefox), rather than trying to force us to use Edge.

It's also nice that generated content isn't immediately splurged into your document: you can refine it in the chat before hitting Insert to transfer it onto the page. There's one aspect of the process that isn't quite perfect, though – the inserted text includes the preamble ("Sure, I can help you get started with…"), which perhaps explains how some published pieces occasionally give away their synthetic origins. Be sure to read through your document carefully when you've finished adding your own content.

SMARTER PASTING

For many decades, the paste function in Word inserted the contents of your clipboard into your document – along with as much of its formatting as it could carry over. We can only guess at how much irritation has been caused over the years by mismatched fonts and colours being dumped onto people's pages whenever they tried to include passages from other documents or from web pages.

At last, the default behaviour has been changed. With recent updates to Word, the default paste behaviour now matches the style and formatting of the surrounding text, so that content copied from elsewhere fits seamlessly in. If you want to keep the original formatting, press and hold Ctrl for a few seconds after pasting; when you release the key, a smart Paste Options menu appears. Merge Formatting is the default, but you can alternatively select Keep Source Formatting to copy the text with its original appearance. You can also change this back to the default, if you wish, by clicking "Set Default Paste…" on this menu.

You'll notice from the screenshot on the left that there are also some new Copilot paste options, which appear once the pasted text has been added to your document. Auto Rewrite will generate a few versions of the original text in different styles and tones for you to choose from; each is previewed in a floating window so you can click between them. If you're working on multiple drafts of a document this can be a big time-saver. Likewise, if you need to repurpose your own content for multiple channels, this could save you writing each one from scratch – or at least give you a number of starting points.

Another simple but welcome interface change is that you can now hold down the Ctrl key and hit the plus and minus keys to zoom in and out, finally making Word's behaviour consistent with other applications.

SAVING TO THE CLOUD

There's been some controversy over recent changes to the way Microsoft 365 apps save documents. Items now save to your OneDrive by default, and the default filenames are now supposed to be time- and date-based – although in our tests, Word seemed to still be using the older format of "Document" followed by a number.

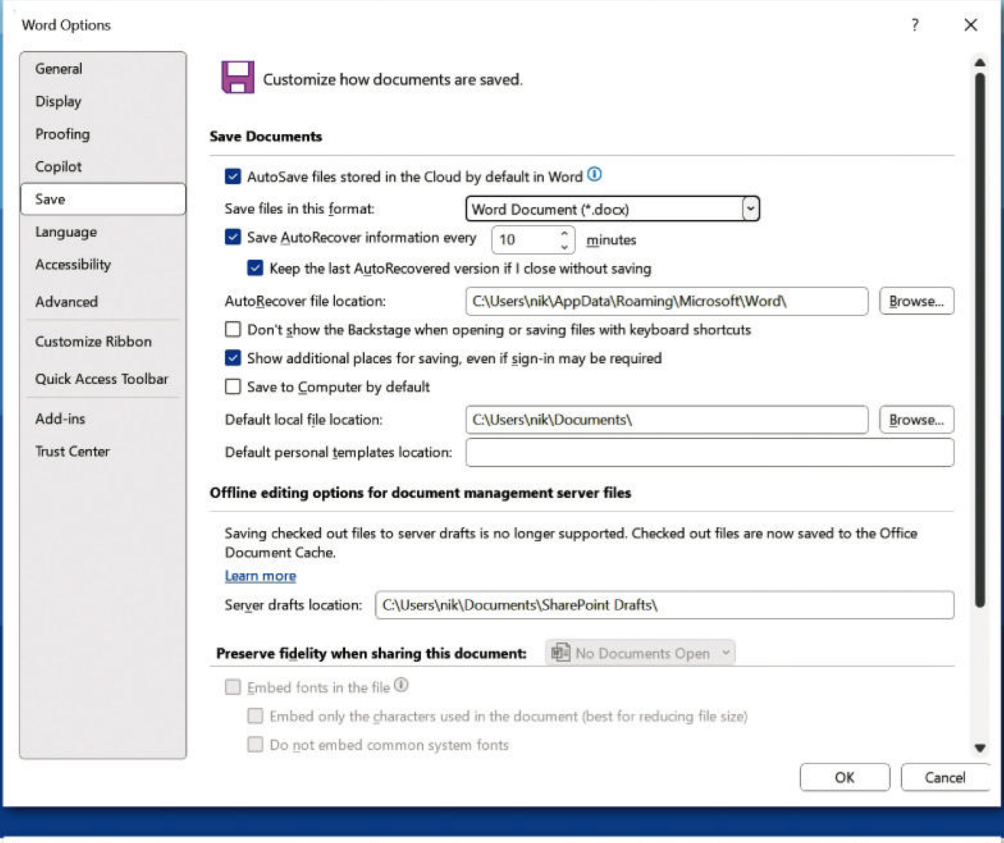
Naturally you can still save files to your hard disk or to other locations, but you have to tell Word that's what you want to do. In the Save dialog box, either click the default online folder beneath "Choose a Location", or click the "More options…" link to open the full Save As screen.

There are advantages to sticking with OneDrive. As has been the case for some time, documents that reside in OneDrive will be continually saved as you continue working on them, Google Docs-style, so your latest amendments will always be visible to collaborators. If you don't like this behaviour, you can

TOP Copilot in the sidebar can be used to structure a document.

ABOVE The default paste behaviour has recently changed to match the document style.

MICROSOFT 365 APPS ARE UPDATED SEVERAL TIMES A YEAR, SO EXPECT TO SEE NEW FEATURES PERIODICALLY


Word Options
?
General
Display
Proofing
Copilot
Save
Language
Accessibility
Advanced
Customize Ribbon
Quick Access Toolbar
Add-ins
Trust Center
Browse...
Browse...
OK
Cancel

Customize how documents are saved.

Save Documents

☑ AutoSave files stored in the Cloud by default in Word ⓘ

Save files in this format: Word Document (*.docx)

☑ Save AutoRecover information every 10 minutes

☑ Keep the last AutoRecovered version if I close without saving

AutoRecover file location: C:\Users\nik\AppData\Roaming\Microsoft\Word\

☐ Don't show the Backstage when opening or saving files with keyboard shortcuts

☑ Show additional places for saving, even if sign-in may be required

☐ Save to Computer by default

Default local file location: C:\Users\nik\Documents\

Default personal templates location:

Offline editing options for document management server files

Saving checked out files to server drafts is no longer supported. Checked out files are now saved to the Office Document Cache.

Learn more

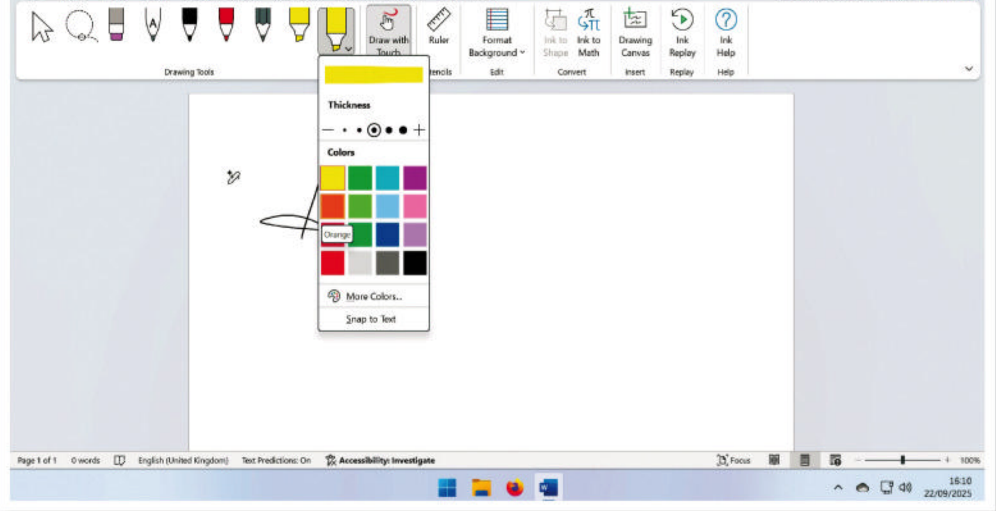
Server drafts location: C:\Users\nik\Documents\SharePoint Drafts\

Preserve fidelity when sharing this document: No Documents Open

☐ Embed fonts in the file ⓘ

☐ Embed only the characters used in the document (best for reducing file size)

☐ Do not embed common system fonts


AutoSave Off
Document1 · Word
Search
File
Home
Insert
Draw
Design
Layout
References
Mailings
Review
View
Help
Comments
Editing
Share
Draw with Touch
Ruler
Format Background
Ink to Shape
Ink to Math
Drawing Canvas
Ink Replay
Ink Help
Drawing Tools
Edit
Convert
Insert
Replay
Help
Thickness
Colors
Orange
More Colors...
Snap to Text
Page 1 of 1
0 words
English (United Kingdom)
Text Predictions: On
Accessibility: Investigate
Focus
100%
16:10
22/09/2025

TOP Autosaving cloud files means any changes will be visible to others immediately.

ABOVE You can add pens to the existing Draw tools, and re-order them as required.

disable it by clicking File followed by Options; then click Save in the sidebar, and untick the box beside "AutoSave files stored in the Cloud by default in Word".

MORE NATURAL HANDWRITING

Microsoft added two new pens to OneNote last year, namely a fountain pen and brush pen – and now they're available in the latest version of Word, as well as Excel and PowerPoint. In Microsoft's words, the fountain pen lets you "flourish", drawing lines of variable thickness depending on speed and pressure, while the brush pen allows you to be more expressive with direction-based thickness.

To find the new pens, click Draw above the ribbon and you should see an Add button at the end of the palette of drawing tools. Click this, and you can select from pen, highlighter, fountain pen, brush pen and pencil.

The Draw tab is also now more customisable than it was in previous releases. Any pen that already exists in your tools palette can now be duplicated (aside from the ink to text pen), allowing you to effectively create your own pen presets. For example, if you're reviewing a document that needs to be amended by two teams, you could duplicate the highlighter by right-clicking it and clicking Add Another Highlighter. You can now adjust the colour option on the drop-down menu to produce a pink highlighter to accompany the yellow highlighter, and use different colours for each team.

Over time, your palette of tools might get long and unmanageable, at which point it makes sense to organise them. Click and hold on a pen to drag it to a new position – perhaps putting your most-used pens on the far left, or grouping pens by type.

ADDITIONAL TOOLS

A few extra tools deserve a mention. If you're working with documents that other people have commented on, you can now switch between contextual comments and list view. The former shows active notes in context, while any that have been resolved will be hidden. To reveal hidden comments, the list view moves annotations to the Comments pane on the right of the screen and shows everything associated with the active document, resolved or not. Clicking a comment in this pane scrolls the document to the corresponding location.

Where a document has a large number of comments from different collaborators, you can also apply filters to reduce the noise. Click the Comments button on the menu bar, then click the Filter drop-down menu and select "Active Only", "Resolved Only" or "@ Mentions Me". The last of these will help you to spot only the comments that it's your responsibility to resolve – you can combine it with the other two filters to further trim the results.

If you're using Microsoft 365 for business, there's also a new dynamic watermarking feature that embeds real-time watermarks in documents you need to share. This feature appeared at the tail end of last year, but you may have missed it as you need to apply the watermarks using the Office web apps. To do so, open your document in the browser version of Word, click its name above the ribbon, then click Sensitivity and select an option, such as General, Confidential or Highly Confidential. The document will be overlaid by a repeating watermark that would be difficult to remove from screenshots without considerable editing.

Microsoft 365 apps are updated several times a year, so expect to see new features appearing periodically. New additions may be highlighted by a pop-up, but you can also keep an eye out for announcements on Microsoft's website. The Microsoft 365 blog (**tinyurl.com/APC553blog**) is a good starting point, and you'll find a rolling list of release notes for each new non-beta version at **tinyurl.com/APC553notes**. ■

FIVE THINGS YOU NEVER KNEW ABOUT QR CODES

There's more to these little mosaics than meets the eye; **Darien Graham-Smith** discovers it's hip to be square.

LEFT Custom codes are used for travel tickets.

1 QR codes can encode all types of data

You're already familiar with QR codes as a quick and easy way to access a web link. All right, it can be fiddly to dig your phone out of your pocket, bring up the camera and point it at the code. Or, if you're the one generating the code, it's a little bit of a pain that you have to use a tool to create the image and embed it into your document, poster or wherever. Hopefully, though, we can all agree that using QR codes is a much better way to share addresses then expecting people to type in URLs manually.

QR codes aren't just for web addresses, however. You might also have come across them in the context of Wi-Fi connections. Some routers have stickers on the back that contain the SSID and passphrase, so you just point your phone and scan the code to get online – or you can generate your own code for a particular network and share it with others, so they can connect without having to tap in "x]2bg\I37H7" by hand.

You might wonder what else a QR code can store – and the short answer is absolutely anything. The QR format is a general-purpose encoding system that merely represents a string of digits, alphanumeric characters or binary data. In the example cases above, it's the scanning device that recognises the data type and handles it accordingly. Other established data types include "vCards" that contain a person's name and contact details, GPS co-ordinates and calendar events – but you can store literally anything you like in a QR code.

The only limit in fact is the size of the code – or to be precise the number of "modules" (squares) it contains, since the code itself can be printed at any size. The standard allows for grid sizes between 21 x 21 and 177 x 177 modules, with the biggest codes capable of representing just over 7,000 numeric characters, 4,296 alphanumeric characters or 2,953 bytes of raw binary data. It's this versatility and available density of information that makes QR codes so useful, allowing them to hold any type of data from event and transport tickets to personal ID and payment tokens.

2 QR codes are older than you think

The rise of QR codes as a way to share web addresses might feel like a recent phenomenon, but the system was invented only a few years after the World Wide Web itself. In 1994, an engineer named Masahiro Hara, working for Japanese car firm Denso Wave, set out to make stock control faster and more reliable by creating a new way to electronically read information from item packaging.

Previously the company had been using regular "one-dimensional" barcodes, which can encode only a very limited amount of information (typically 13 numeric characters). This meant that a box containing multiple parts would be labelled with multiple barcodes, each one needing to be scanned separately. Barcodes also need to be scanned in a straight line, with the scanner oriented along the length of the code, making things even more fiddly.

Hara took advantage of the increasing availability of cheap cameras to create a new 2D encoding system. As we've mentioned, his design could store hundreds of times more information than a barcode, and could be read from any angle, allowing workers to capture all the information about a package in an instant. Accordingly, Hara dubbed his invention "quick response codes" – or QR for short.

Hara also took the opportunity to improve reliability, building in error detection and redundancy features so the code could be read even if it was partly obscured or damaged. Four different levels of error correction are supported by the standard: low, medium, quartile and high, allowing accurate reading of the code even if 7%, 15%, 25% or 30% of it is missing or misread. The trade-off is that higher levels of error correction reduce the data density, so you need a bigger code to carry the same information.

You can store literally anything you like in a QR code. The only limit is the size of the code

What really made QR technology take off was Denso Wave's decision to allow anyone to freely make and use standard QR codes. In the year 2000, QR was adopted as an ISO standard, and today all the original IP rights have

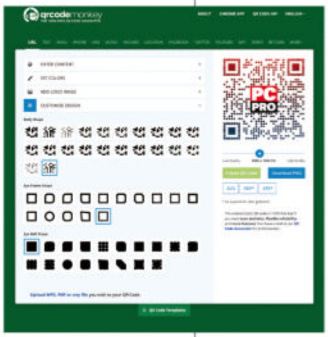
RIGHT QR codes were originally invented for stock control.

now expired, meaning you can not only create your own QR codes, but also produce derivative codes and develop the technology in your own direction if you wish. For example, **thetrainline.com** uses its own e-ticket format that's clearly based on QR technology, but which uses a custom encoding system that makes it harder to fake and spoof tickets.

3 QR codes can be heavily customised

QR codes are instantly recognisable by their square shape, their black and white mosaic design and the three big squares ("finders") in the corners. Yet it's quite possible to make them look more interesting if you so wish. The error correction that's baked into the codes means they'll continue to work even if part of the area is covered by an image or logo. For example, if you create a QR code in the Chrome browser – by opening the application menu and selecting "Cast, save and share | Create QR code" – you'll see that the generated code features a funky pixellated dinosaur in the middle, an emblem that Masahiro Hara certainly did not include in the original specification.

You can also take liberties with the design; for example, Chrome QR codes use round black dots on a white background instead of squares, and you can experiment with different colours to make your code friendlier than the rather industrial standard design.



ABOVE Using free tools you can create and customise your own QR codes.

There are various free online QR code generators that let you play with logos and design; one option that offers lots of variations is **qrcode-monkey.com**. Alternatively, you can experiment in any paint program, by taking a standard code and applying your own adjustments. You can use your phone to check that the code still works, but don't push it too far – if a code is at the edge of readability on your screen and with your phone, it might not work at all for someone using different devices.

4 QR codes don't always have to link to one place

QR codes are static, in the sense that they convey predefined information that can't ever change. If you scan a QR code in 100 years' time with your Samsung Galaxy S125 smartphone, you'll get the exact same information as you would today (although it's an open question whether the destination website, or the World Wide Web itself, will still exist).

In one sense this makes QR codes very reliable and secure (although see

Other 2D codes

Micro QR

Designed for the smallest labels, Micro QR codes can hold up to 35 numbers or 21 alphanumeric characters in a tiny code with a single finder in the top-left corner.

Rectangular Micro QR

Rectangular Micro QR (rMQR) codes use the same encoding system as regular QR codes, but are shaped to fit onto packaging and labels originally designed for barcodes. They can be recognised by their large square in the left corner (or left side, as above), and the smaller square in the lower right. Plus, of course, the fact that they're rectangular.

Frame QR

Frame QR codes look like regular QR codes with the middle cut out: they're intended to allow designers to insert their own graphics inside the code, without affecting the code's error-correction capabilities. Unfortunately, they're not recognised by current smartphones, making them less attractive than simply customising a regular code.

Data Matrix

Data Matrix codes don't have finder squares, instead indicating their orientation via a pattern of solid and dotted lines around their edges. Their space-efficient design means they can be much smaller than QR codes, while carrying up to 3,116 characters of either text or binary data. Again, most phones can't natively read Data Matrix codes, but there are free apps that can decode their content if you're curious.

Microsoft Tag

Originally developed back in 2007, Microsoft Tag was a square code that encoded data in patterns of triangles in either four or eight colours. The use of multiple colours means Microsoft Tags can store more information than a similarly sized QR code – they can fit up to 3,500 characters into an inch-square label – but the technology never widely caught on, and support ended in 2015.

HCC2D

"High-capacity coloured two-dimensional codes" are another system that uses colour to increase data density. HCC2Ds look just like QR codes, only more colourful – but their reliance on colour makes them more susceptible to errors than black and white codes, especially in poor lighting. Proposed back in 2014, HCC2D codes haven't found mainstream adoption, and at this point it seems unlikely they ever will.

Visits
300
150
Aug 29
1,203 people visited this site
Visits
2,721
1,203

LEFT Website analytics help you track how often your QR codes are being scanned.

“QR security”, right). However, their fixed nature raises a potential issue if you’re sending codes out into the world for public consumption, which might remain in circulation for many years. After all, you don’t want old codes floating around pointing to outdated pages or dead links.

The solution is to use redirection. Instead of hard-coding the address of your desired web page directly into your QR code, make it link to an interstitial page that redirects visitors to the intended site. You can then update this page at any time to change the effective destination of the code, so it can always point to the latest version of your CV, your online showreel, your list of items for sale or whatever – even if your content moves to a totally different location.

The only catch here is that you need to control the “landing page” that the QR code links to. Third-party shorteners such as **tinyurl.com** don’t usually let you change the destination of a link once it’s been created. This is to deter scammers from creating “bait and switch” attacks where a legitimate link is widely spread and shared, then – once it becomes popular – abruptly switched to a malware or phishing site. Other services, such as **bit.ly**, only allow redirection editing for paying users.

By far the easiest solution is to use your own website, if you have one. Just make your QR code point to a page within your own domain that contains the following code:

```
<!DOCTYPE html>
<html>
<head>
<meta http-equiv="refresh" content="0;
url=https://www.destination.com/
mypage">
<title>Redirecting...</title>
</head>
<body>
<p>If you're not redirected automatically,
please <a href="https://www.destination.
com/mypage">click here</a>.</p>
</body>
</html>
```

This gives you full control, and will work for as long as your website is active; you can update the destination address at any time, with instant effect.

If you don’t already have a web host and domain name then setting one up will obviously be an expense, but it doesn’t have to be a huge one. The code above comes to just 294 bytes, so you can get by with the tiniest of storage and bandwidth allowances. And if you’re setting up a site purely for forwarding purposes, there’s no need to pay big bucks for a prestige domain name. After all, no-one will ever need to enter it, or even see it beyond the brief moment while they’re being redirected.

As well as letting you route traffic wherever you want, using redirects allows you to collect statistics about traffic coming from QR codes. Most hosting packages offer analytics that can track how many “hits” your redirect page is getting – so you can see how many people are scanning your QR code, even if it’s ultimately taking them to a remote site.

For more granular tracking, you can create multiple redirect pages, all pointing to the same destination but accessed via QR codes. In this way a small business could, for example, see how many people are scanning the QR code from a promotional flyer, versus one in a printed brochure.

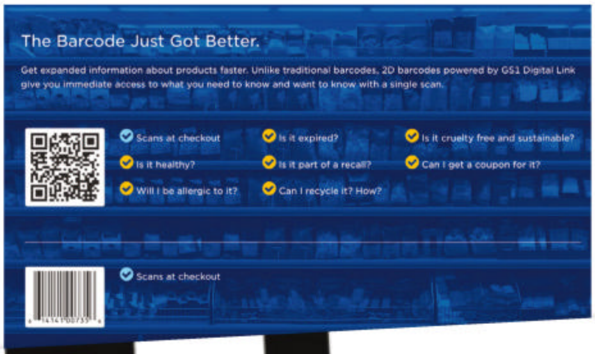
5 QR codes may soon replace barcodes

Although QR codes were specifically invented to replace barcodes, we’re still using the old technology 30 years later. But barcodes may finally be on the way out: a project called “Sunrise 2027”, promoted by GS1 – the independent industry body that develops supply chain standards – aims to ensure that retailers around the world can read QR codes as well as old UPC labels by the end of 2027.

This will not only help speed up checkouts, with fast, reliable scanning; it will also allow far more information to be encoded into product packaging. Goods handlers at every step of the supply chain, from manufacture to retail, will be able to scan a code and see not only the unique product code but other key information such as the lot number and expiration date. This obviously creates huge potential for improved automation and tracking.

But this isn’t just for the benefit of the industry: there will also be more information for consumers. As well as use-by dates, QR product codes can include at-a-glance details of ingredients, allergens, country of origin and more, and companies can embed their own web links, for promotions, loyalty schemes or interactive information sources.

Supermarkets are already updating their point-of-sale hardware in preparation, with some larger retailers allowing customers to use their own smartphones to scan items as they shop – meaning all that’s needed is a simple app update. ■



The Barcode Just Got Better.

Get expanded information about products faster. Unlike traditional barcodes, 2D barcodes powered by GS1 Digital Link give you immediate access to what you need to know and want to know with a single scan.

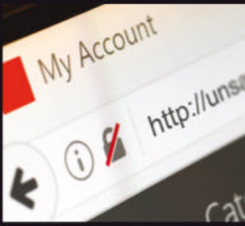
Scans at checkout
Is it healthy?
Will I be allergic to it?
Is it expired?
Is it part of a recall?
Can I recycle it? How?
Is it cruelty free and sustainable?
Can I get a coupon for it?
Scans at checkout

BELOW The industry body GS1 is keen for retailers to move to QR codes

QR security

You might think there’s not much that can go wrong with a QR link – after all, it’s basically the same as printing a URL in plain text, right? But there’s one big difference: since QR codes aren’t readable by humans, a person scanning one has no way of knowing exactly where it will take them.

You can inspect the URL before interacting with the destination site, but this isn’t always easy on a mobile browser, and you could end up on a fake site without realising it. We’ve also heard of scammers printing out their own QR codes and sticking them over the top of legitimate codes. If you don’t look carefully, a genuine poster or ad could have been hijacked with a fake code that takes you to a phishing page and steals your personal information.



Even with completely original QR codes, the permanency of the medium introduces an element of risk. If an old code points to an expired address, someone else could register the target domain and put their own landing page in place of the defunct real one. In this scenario there really is no way for an innocent visitor to tell if they’re being tricked; if you’re a QR creator, your best practice is simply to keep your domain active for as long as possible, and ideally give visitors confidence by including a description of what they should expect to see after scanning. For example, if you put “visit my personal website” next to the code, visitors will know to be suspicious if they arrive instead at what looks like a payment portal.

MICROSOFT DEFENDER *vs* THE WORLD'S BEST SECURITY SUITES

WITH MICROSOFT'S TOOL NOW OFFERING SOLID PROTECTION YEAR UPON YEAR, WE FIND OUT WHICH OF THE SECURITY SUITES JUSTIFIES ITS PRICE.

We all know that Microsoft Defender works pretty well. Released in the days of Windows XP's prime in 2006, it had a spluttery start compared to established tools, but thanks to Microsoft's continued investment and the small fact it's installed by default on hundreds of millions of computers – not a bad testbed – it traditionally holds its own in annual tests against malware.

Take a look at the graphs on p78, however, and you'll see that its latest set of results falls behind the rest. If you want the best protection but you don't want to pay then it makes sense to switch to Avast, Avira or the others that we mention in our best free antivirus section on p77.

So, why pay, other than to avoid those painful "UPGRADE NOW!" pop-ups? The answer comes in the ever-more impressive bundle of software that comes with the security suites on test this month. We're not talking about makeweight apps such as password managers and tune-up tools, which are best ignored. We're talking about the apps that genuinely add value.

Top of the list is the obvious: a VPN service has never been needed more than today, and remember these suites cover multiple devices, including your phone and tablet. Other useful extras include ransomware protection, parental controls, device tracking and webcam protection.

We think these are worth the $79 to $89 of our award winners, but we can't emphasise enough that you should either buy from third-party websites or switch off automatic renewal. That way painful surprises lie. But the best way to avoid painful surprises is to read our buying guide and reviews with due care and attention.

CONTRIBUTOR KG Orphanides

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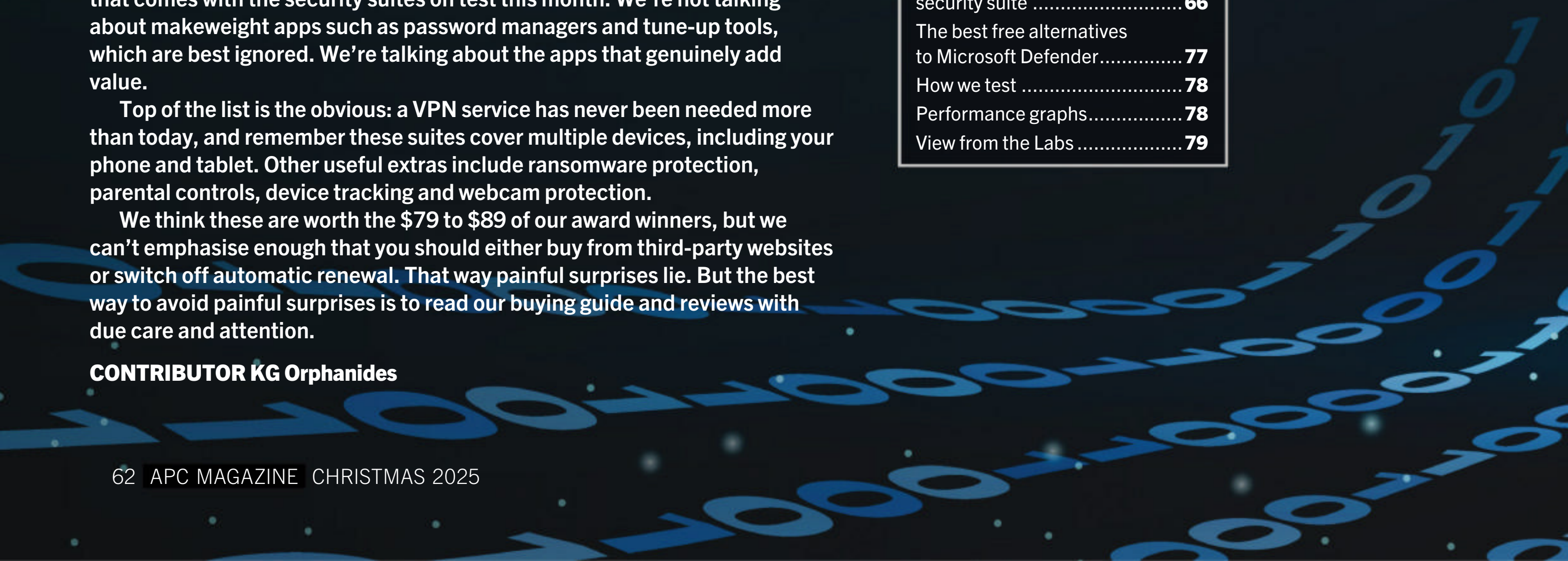


	LABS WINNER			
	Avast Ultimate	**Avira Prime**	**Bitdefender Total Security**	**Eset Home Security Ultimate**
Overall rating	★★★★★	★★★★☆	★★★☆☆	★★★★☆
Website	avast.com	avira.com	bitdefender.cm	eset.com/au
Desktop clients	macOS, Windows	macOS, Windows	macOS, Windows	macOS, Windows
Mobile clients	Android, iOS	Android, iOS	Android, iOS	Android, iOS
Pricing				
First year's price direct	1 PC, $64.68; 10 devices, $79.08	5 devices, $80.95	5 devices, $89.99	5 devices, $139.99
Renewal price direct	1 PC, $134.99; 10 devices, $169.99	5 devices, $147.95	5 devices, $159.99	5 devices, $TBA
Features				
Firewall	✓	✓	✓	✓
Browser protection: link checking or site blocking	✓	✓	✓	✓
Ransomware protection (dedicated module)	✓	✗	✓	✓
Cloud backup	✗	✗	✗	✗
Webcam protection (dedicated module)	✗	✗	✓	✓
VPN	✓	✓	✓	✓
Password manager	✗	✓	✗	✓
Scheduled scans?	✓	✓	✓	✓
Silent detection/ gaming mode	✓	✓	✓	✓
Parental controls	✗	✗	✓	✓
Device management/tracking	✓ (mobile only	✗	✓	✓
Bootable rescue disk	✓ (in-client tool)	✓ (free download)	✗	✓ (free download)
Breach monitoring	✓	✓	✓	✓
Data broker removal service	✗	✗	✗	✗
Identity theft/lost wallet support	✗	✗	✗	✗
Test results				
AV-Test Real-world [1]	100%	100%	100%	100%
AV-Test Real-world [1]	100%	100%	100%	100%
AV-Test Reference [1]	100%	100%	100%	100%
AV-Test Reference [1]	100%	100%	100%	100%
AV-Test false positives (total)	0	0	0	0
AV-Test protection score	6	6	6	6
AV-Test performance score	6	6	6	6
AV-Test usability score	6	6	6	6
AV-Comparatives Real-World Protection – % blocked	100%	99.1%	98.2%	99.1%
AV-Comparatives Real-World Protection – false positives	5	0	1	1
SE Labs Protection rating	100%	Not tested	Not tested	Not tested
SE Labs Legitimate Accuracy	100%	Not tested	Not tested	Not tested
SE Labs Total Accuracy rating	100%	Not tested	Not tested	Not tested

[1] AV-Test results are based on four batches of tests. See AV-Test.org for details.

			RECOMMENDED	
F-Secure Total	**McAfee+ Ultimate**	**Microsoft Defender Antivirus**	**Norton 360 Deluxe**	**Trend Micro Maximum Security**
★★★☆☆	★★★★☆	Not applicable	★★★★★	★★★☆☆
f-secure.com	mcafee.com	microsoft.com	au.norton.com	trendmicro.com
macOS, Windows	macOS, Windows	macOS, Windows	macOS, Windows	macOS, Windows
Android, iOS	Android, iOS	✗	Android	Android, iOS

5 devices, US$84.99	Individual, unlimited devices, $299.95); Family, unlimited devices, $449.95	Free to Windows users	3 devices, $89.99	1 device,$49
5 devices, US$84.99	Individual, unlimited devices, $399.95); Family, unlimited devices, $599.95	Free to Windows users	3 devices, $149.99	1 device, $69.95

✗	✓ (works alongside Windows firewall)	✓	✓	Booster
✓	✓	✓	✓	✓
✓	✓	✓	✓ (cloud backup service)	✓
✗	✗	5GB (OneDrive)	50GB	✗
✗	✓	✗	✓	✗
✓	✓	✗	✓	✗
✓	✓	✓ (via Microsoft Authenticator)	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	Family plan only	✓	✓	✓
✓	✓	✓	✓	✗
✗	✗	✗	✓ (free download)	✓ (free download)
✓	✓	✗	✓	✗
✗	✓	✗	✗	✗
✓	✓	✗	✓	✗

100%	99.5%	99.8%	100%	100%
100%	100%	100%	100%	100%
100%	100%	100%	100%	100%
100%	100%	100%	100%	100%
0	0	0	0	5
6	6	6	6	6
6	6	6	6	6
6	6	6	6	5.5
98.7%	99.6%	99.1%	100%	0.995
0	2	3	3	52
Not tested	100%	93%	99%	Not tested
Not tested	100%	100%	100%	Not tested
Not tested	100%	97%	100%	Not tested

How to choose your perfect security suite

Spend too little and you may miss out on compelling features; spend too much and you may be wasting your money. When it comes to security suites, it pays to look at the small print.

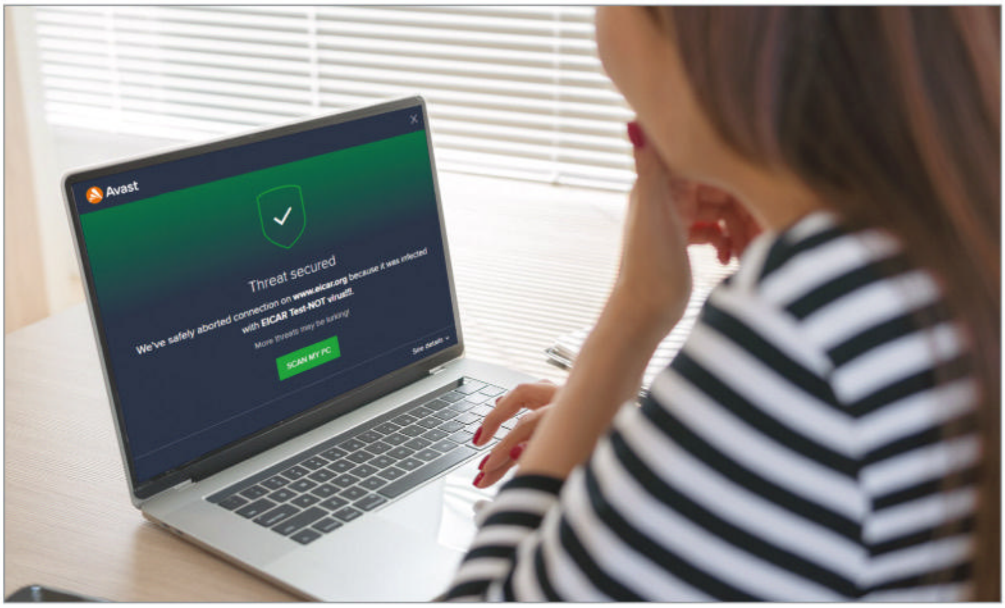
Modern security software packs in countless features, and we cover these as part of each review. But never forget that the key feature you're looking for is protection against malicious software. That should always be your top priority.

That means that real-time malware protection is *the* critical aspect of a security suite. This is a service that continuously monitors your PC for malicious software, primarily by scanning new files and websites your computer encounters.

It's also our minimum bar for inclusion in this group test. For example, the free edition of Malwarebytes is effective and justifiably popular, but, unlike its paid-for version, only provides on-demand scanning.

Every single product in this group test will protect your computer against most malicious software. We know this thanks to the stalwart efforts of a trio of independent testers: AV-Comparatives (**av-comparatives.org**), AV-Test (**av-test.org**) and SE Labs (**selabs.uk**). We publish the key findings of each company's latest results at the top of each review, with more detailed graphs from p78.

Note that we say "most malicious software" in the paragraph above. These organisations also assess edge cases, unfamiliar malware and false positives. The marginal instances that can potentially destroy the health of your PC and all the data it holds.


Avast
Threat secured
We've safely aborted connection on www.eicar.org because it was infected with EICAR Test-NOT virus!!!
More threats may be lurking!
SCAN MY PC
See details

ABOVE The best antivirus determines threats by looking at the behaviour of a file.

Malware signatures – the hashes of known malicious files – remain important to both real-time and on-demand scanning, and this is why you still see testing houses running flat file scans against large batches of recently collected malware introduced on a disk.

Polymorphic viruses and other forms of obfuscated malware have been around for decades, which is where heuristic scanning comes in

But polymorphic viruses and other forms of obfuscated malware have been around for decades, which is where heuristic scanning comes in: this looks at characteristics and behaviours of a suspicious file or process to determine whether it's likely to be a threat.

Does it use known detection-evasion techniques such as encryption or compression ("packing")? Does it engage in potentially threatening behaviour such as attempting to delete files or terminate processes? Characteristics such as these allow antivirus software to decide whether an unknown program is likely to be a threat or not.

Can it beat Microsoft Defender?

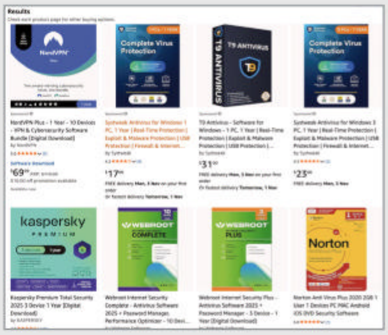
The fundamental question about any third-party antivirus solution is whether it can consistently perform better than Microsoft Defender, which comes built into Windows 10 and 11, and requires no additional software installation or payment.

The fact that you don't need to install anything new or update any licences for Defender makes it a compelling choice when it comes to protecting the PCs of less tech-savvy friends and relations. But that's only assuming that its protection continues to meet the grade.

Due to the huge number of systems it's deployed on, Microsoft has a real advantage when it comes to obtaining malware samples to analyse, which

Buying direct or via third parties

In general, suppliers want you to buy direct from their sites. It's curious, then, that they often punish loyal customers with a price rise in their second year. Not that they call it that: they talk of special offers, and this allows them to show promises such as "70% OFF!" But be very careful, as they will auto-renew unless you're careful, and a year later you're hit by the full and often wincingly high price.



ABOVE There are plenty of security software bargains to be found at amazon.com.au.

That's why we will often direct you to third-party retailers. Amazon is generally a solid choice, but the prices fluctuate so check you're not paying over the odds. The only downside to third-party stores is that you may not be able to buy exactly the same package as provided direct. That's especially true for services such as identity tracking. Take a careful look at what's on offer from each product to make sure it's what you want.

informs not only its malware signature database, but also the behaviour data it has to add to its heuristic rules of thumb for sketchy software.

Microsoft has come to focus on enterprise-grade endpoint protection features that it sells to commercial clients. The basic version of Defender that ships with Windows still provides excellent protection that's more effective than many paid-for third-party antivirus tools. However, its performance has been slipping based on recent data from testing houses.

ABOVE Some products offer dedicated webcam protection.

Free doesn't equal bad

This month's group test focuses in detail on the best and most relevant paid-for antivirus suites for *APC* readers; these are generally the most feature-packed options from each company. We also try to provide enough information to help you decide if a cheaper product might work better for you.

We should, however, emphasise that free antivirus is not one of those you-get-what-you-pay-for deals. Antivirus companies benefit by getting more data about malware that their free users encounter, by promoting their paid-for products, and by the reputational boost that their free products bring.

More expensive security suites generally include features that are more expensive to provide, from online password managers to cloud backup and even hands-on helplines in case you lose your wallet or have your identity stolen.

Extra features

Our reviews are weighted heavily towards real-time protection against malware. However, most of the products in this group test do a lot more, which is what justifies their status as fully fledged security suites.

Some of these features are specifically to do with device security. For a start, there's ransomware protection that can lock down and/or back up your most important folders. These suites often provide web-based management consoles that allow you to remotely find, lock down or wipe lost computers or mobile devices.

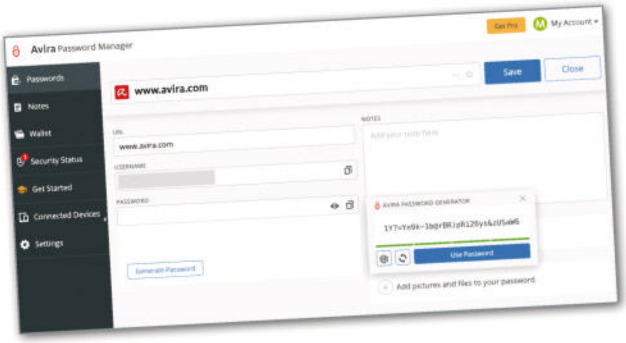
Then there are extra modules such as dedicated webcam protection, which alerts you if an unusual app is accessing your camera. We also see bootable rescue disks to help you recover after a malware infection, and firewall software that, in almost all cases, has a less creaky interface for creating rules than Microsoft's integrated solution.

> **While it's convenient to get everything bundled together, you're not necessarily going to get the best of all worlds**

Other features are still security-oriented, but broader in the net they cast. These are usually things that you might otherwise buy or download as a dedicated service, such as password managers, parental control software, cloud backup services and VPNs.

While it's convenient to get everything bundled together, you're not necessarily going to get the best of all worlds, and you don't necessarily want your password manager or cloud backup provider – long-term, high-security subscriptions by their nature – to be tied into a bundle with a malware protection suite that you might decide to swap to another provider in a year's time.

BELOW We advise you steer clear of bundled password managers.



www.avira.com

AVG
ULTIMATE
SECURITY, PRIVACY, & PERFORMANCE
Antivirus & anti-ransomware
Shopping & banking protection
Firewall & webcam security
All-in-one cleanup & tuneup
VPN Protection
AntiTrack
10 DEVICES
2 YEARS
MULTI-DEVICE

Where's AVG this month?

We're very aware that AVG isn't featured in this month's group test, but there's a good reason for that: Avast and AVG are essentially the same product in different clothing. As we give each product an in-depth, full-page review this year, we decided it would be a waste of space to review both brands.

However, before simply plumping for Avast as we cover it this month, it's worth checking out their prices. AVG Ultimate costs $79.99 direct, which is $15.31 more than Avast Ultimate, and you may prefer its interface. As both products offer 30-day money-back guarantees if you download them direct from their respective sites, you can also give them a free trial – but only if you remember to cancel the subscription within the timeframe.

If you're a power user, you probably already have opinions and requirements about many of these things. If you use multiple operating systems, or want a VPN that you can deploy to your router, the VPNs bundled with security suites rarely provide sufficient flexibility.

Bundled parental control suites tend to be mostly okay, with the caveat that they don't do very much that Microsoft Family Safety or macOS Parental Controls don't. Their main advantage is that they offer a cross-platform solution.

The final category of extras consists of tools such as local encrypted data stores, secure file shredders, Registry cleaners, disk usage analysers and even disk defragmenters. Although they can be handy, there are free/open-source applications that do as well or better in almost all cases, so these can be safely ignored as filler.

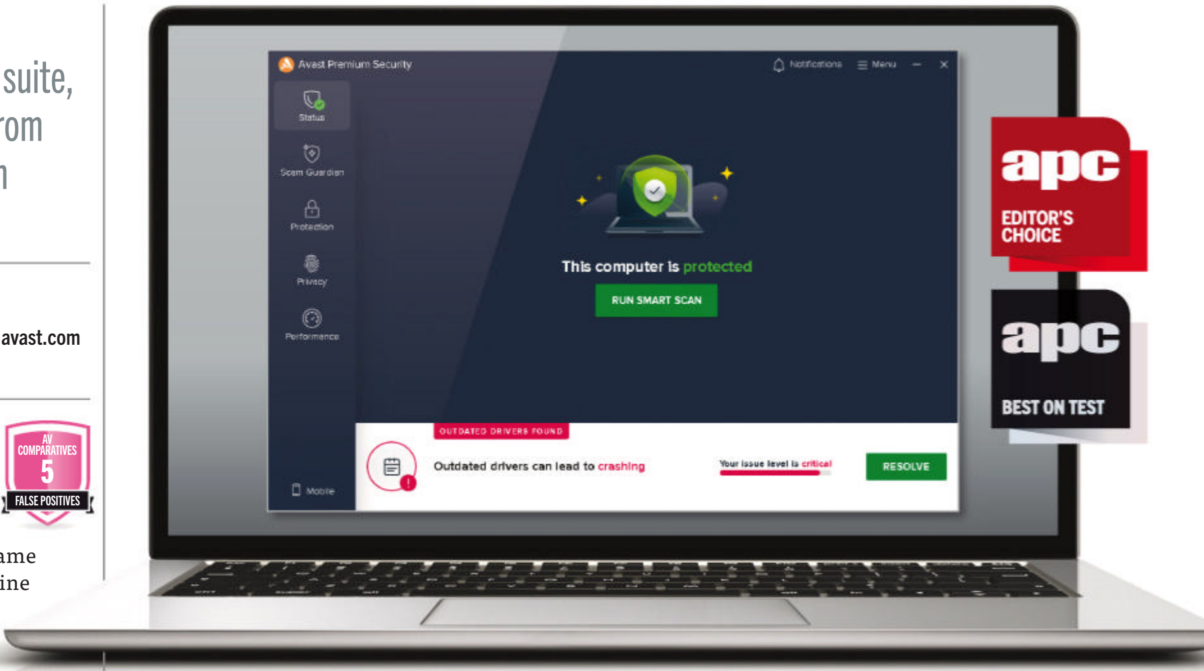
Avast Ultimate

Our top choice security suite, but the best deals are from third parties rather than Avast's own website.

SCORE ★★★★★

PRICE 10 devices, 1 year, $79.08 from avast.com

AV-TEST 100% PROTECTION | AV COMPARATIVES 100% PROTECTION | SE LABS 100% PROTECTION | AV COMPARATIVES 5 FALSE POSITIVES



This computer is protected

Outdated drivers can lead to crashing

Your issue level is critical

ABOVE Avast picked up 100% of the threats in the three real-world tests that we use.

Avast and AVG use the same malware detection engine and tools, wrapped in different desktop clients. We've chosen to review Avast, as AV-Test data shows its client to have less of an impact on system performance than AVG's.

Avast came top of the malware protection tests we use, aggregated from three highly reputable testing houses. It detected 100% of threats in AV-Test's real-time exposure and flat file scanning tests, with no false positives. It similarly scored a 100% total accuracy rating in SE Labs' test, defending against all threats during live malware exposure tests, with no false positive identifications of legitimate software or websites. In AV-Comparatives' real-world tests, it protected against all threats but picked up five false positive identifications. Nonetheless, it's still one of the best performing anti-malware tools in the tests.

When it comes to real-time malware detection and protection, you'd actually be perfectly well off with almost any version of Avast, including Avast Free, as they all use the same malware detection engine, as does sibling antivirus suite AVG. However, we recommend Avast as regular results from AV-Test show that AVG's version of the two services' near-identical clients is a little heavier when it comes to system load, most conspicuously when it comes to website loading and software installation times. The difference is pretty negligible, especially on higher-end hardware specifications, so whichever you find cheapest is as good as the other.

Avast products can be bought either directly from the company, or via third-party retailers, such as Amazon. If you prefer to go direct, you can buy Avast Premium Security for $95.88 initially and thereafter at $119.99, while Avast Ultimate – which we're focusing on here – costs $79.08 for the first year and $169.99 per year upon renewal. Both licences cover up to ten devices.

In either case, make sure to cancel your subscription in advance if you don't want an unexpected price hike. If your subscription runs out before you add a code for a fresh copy of your paid-for version of Avast, it will revert to Avast Free, which still provides very respectable protection.

However, we really do recommend shopping elsewhere as you can find Avast Ultimate subscriptions on sale for less than half the price. Make sure that you don't hand over your billing data for a renewing subscription and you can simply buy new Avast subscription codes when yours runs out.

When it comes to the advantages of the paid-for versions of Avast (and AVG), there are some genuinely compelling reasons to cough up for Avast Ultimate, the top-tier version of the software.

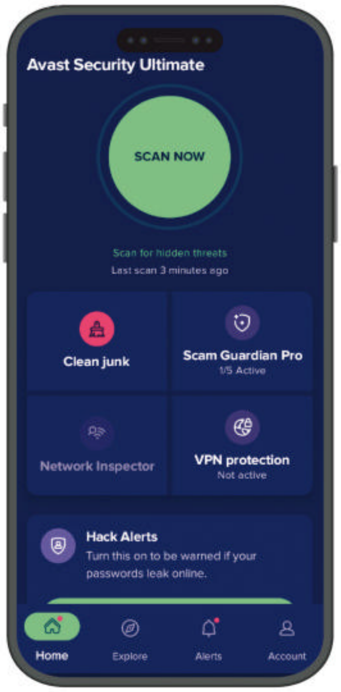
Notable among these are three bonus applications above and beyond the features you get bundled into either the free version or the Avast Premium Security tier. First is Avast SecureLine VPN, a fully featured consumer VPN service that works well on Windows, macOS, Android and iOS. Next up, Avast Cleanup Premium, a reasonably capable and easy-to-use Registry and temporary file cleaner designed to improve performance and free disk space. Finally Avast AntiTrack is an online privacy tool for Windows that blocks and spoofs tracking cookies to prevent advertisers from building a profile of your online activities.

While many of the Registry cleaning and anti-tracking features can be replaced with free tools such as Wise Registry Cleaner, Privacy Badger and uBlock Origin, Avast's extra tools are genuinely useful products that you might otherwise consider paying for on their own, and all of them do what they claim to.

Both Avast Ultimate and Avast Premium Security have more features than Avast Free, including a sandbox in which you can safely run suspect executables, a firewall that's nicer to use than Windows Defender, dedicated webcam protection software, a file shredder, a software update tool and DNS redirection protection. Not a bad haul at all.

Avast is a subsidiary of Gen Digital, which formed when Avast merged with NortonLifeLock in 2022. Norton 360 also appears in this group test, as does Avira Prime, both Avast subsidiaries. Unlike AVG, neither of these shares a detection engine with Avast, although both put in a strong performance in recent tests by AV-Test and AV-Comparatives, making Norton 360 our second choice after Avast Ultimate.

BELOW Avast Ultimate comes with some useful features that the free version lacks.



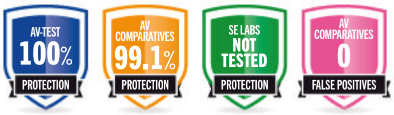
Turn this on to be warned if your passwords leak online.

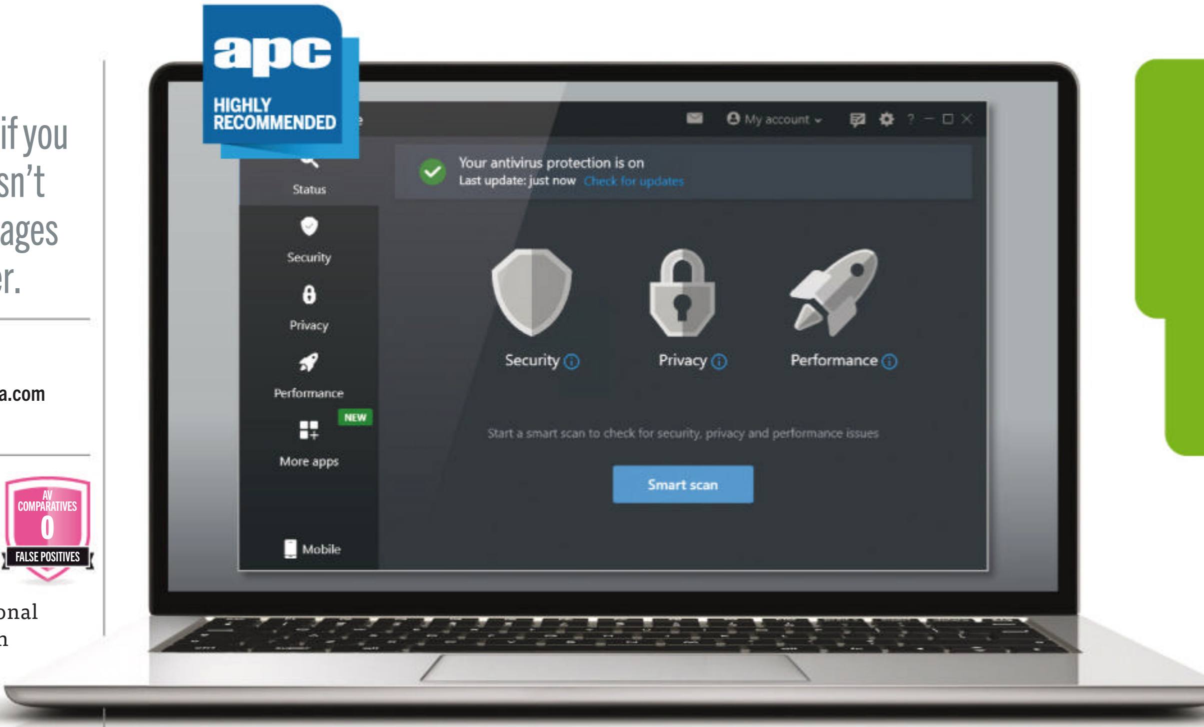
Avira Prime

Available at a low price if you shop around, but it doesn't offer significant advantages over Microsoft Defender.

SCORE ★★★★☆

PRICE 5 devices, 1yr, $80.95 from avira.com





Your antivirus protection is on
Last update: just now Check for updates

Start a smart scan to check for security, privacy and performance issues

ABOVE Avira Prime performs well but the free version will cover many users' needs.

Avira is part of international cybersecurity giant Gen Digital, which formed in 2022 after US-based NortonLifeLock merged with Czech anti-malware company Avast. Still headquartered in Germany, Avira was at the time a subsidiary of Avast and is now a subsidiary of the Gen Digital holding group.

Avira is available in a number of different versions, including Avira Free Security. This costs nothing but uses the same malware detection engine as all the company's commercial offerings: Avira Antivirus Pro, Avira Internet Security and Avira Prime.

If you subscribe to Avira Prime directly from the company's website, you'll pay $80.95 for a one-year, five-device subscription, but this renews at $147.95. Such a steep increase means you should immediately disable automatic subscription renewal. In fact, as with many antivirus and security tools, the most economical way of subscribing to Avira is to buy a subscription code from a third-party retailer.

So what extra do you get compared to the free version? Avira Antivirus Pro adds a firewall to your real-time malware protection, while Internet Security address a software updater and password manager – but you definitely don't need to buy the latter from Avira compared to more refined products such as Bitwarden and KeePass. Avira Prime comes with a selection of PC tune-up tools and, most notably, a copy of Avira Phantom VPN.

While not a product that appears regularly in our VPN group tests, Avira Phantom VPN provides a solid service, keeps no identifying user connection data, and is generally a reliable choice if you don't have any particularly specialised requirements from your VPN provider. If you do, though, then you probably already have a favourite.

Avira's malware-detection engine, which is widely licensed by third-party anti-malware tools, performs consistently well, as evidenced by years of results from testing houses. SE Labs hasn't reviewed it since 2023, but we have recent data from AV-Test and AV-Comparatives.

Like most of its peers, Avira detected 100% of malware in both flat file scanning and real-world exposure tests carried out by AV-Test, with no false positives. However, AV-Comparatives' latest tests were more challenging for all contenders, and Avira blocked 99.1% of malware during a live exposure test with – rather impressively – no false positives.

Note that both of these scores put it close to being on a par with the standard consumer edition of Microsoft Defender that ships with Windows, which differed only in that it picked up some extra false positives in the AV-Comparatives' assessment.

You can also expect similar performance from Avira Free Antivirus, so the outstanding question is: are any of Avira Prime's features sufficiently compelling to make it a better choice for your PC than either integrated Microsoft Defender, its own free tier, or group test leader Avast Ultimate?

That's probably a no for most users. The VPN is reliable but not especially exciting or competitive in a market that includes both performance-focused options such as NordVPN and privacy-first contenders such as Mullvad. The mobile app feels sparse, but includes file scanning, real-time protection and a VPN, as well as monitoring other apps on your phone for potentially dubious activity.

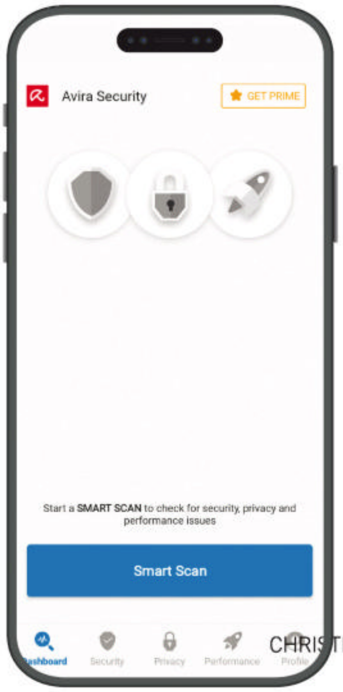
Avira's malware-detection engine performs consistently well, as evidenced by years of results from testing houses

It's not specifically a feature of this security suite, but we've always had a soft spot for Avira's Rescue System disc, a free bootable ISO that you can use to scan your hard disk when malware has got so out of hand that you can't actually get your antivirus tools to load. You can download this for free from Avira's website, and it's well worth keeping on hand for emergencies.

Avira Prime performed well in recent tests and will certainly protect you against the vast majority of malware found in the wild on the internet. If you bought a two-year subscription and it's still running, there's no reason to change to another anti-malware service. However, there simply isn't a strong argument to choose Avira right now, in favour of the more capable protection provided by its sibling and rival Avast.

However, if you're looking for a European-based service, without connections to the US, Russia or any large-scale holding companies, you should consider Slovakia-based Eset, which performed very similarly to Avira.

BELOW The mobile app includes file scanning, real-time protection and a VPN.



Start a SMART SCAN to check for security, privacy and performance issues

Bitdefender Total Security

Offers effective protection, but neither its malware detection nor its features set it apart from the rest of the suites on offer.

SCORE ★★★☆☆

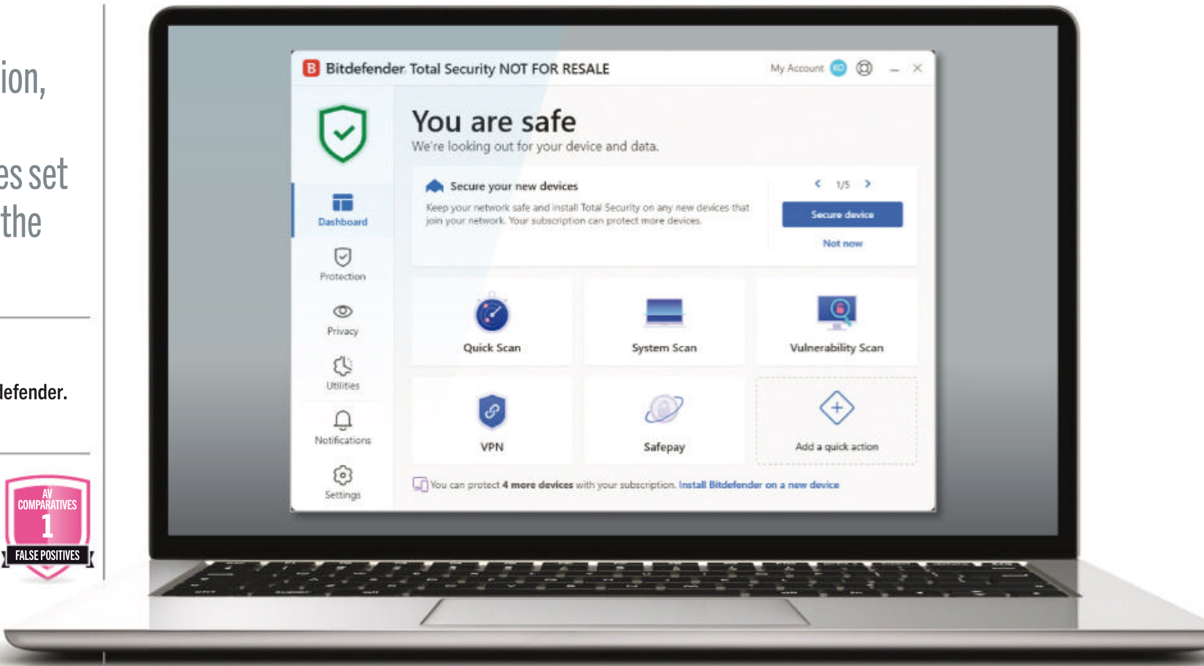
PRICE 5 devices, 1 yr, $89.99 from bitdefender.com

AV-TEST 100% PROTECTION

AV COMPARATIVES 98.2% PROTECTION

SE LABS NOT TESTED PROTECTION

AV COMPARATIVES 1 FALSE POSITIVES



Bitdefender Total Security NOT FOR RESALE

You are safe

We're looking out for your device and data.

Secure your new devices

1/5

Keep your network safe and install Total Security on any new devices that join your network. Your subscription can protect more devices.

Secure device

Not now

Quick Scan

System Scan

Vulnerability Scan

VPN

Safepay

Add a quick action

You can protect 4 more devices with your subscription. Install Bitdefender on a new device

ABOVE Bitdefender's web console provides excellent device management features.

Romanian antivirus firm Bitdefender has grown to become a multinational cybersecurity vendor serving both home and enterprise customers. It's first and foremost a European company, which may reassure those who would rather avoid the USA's privacy and security climate, but is officially headquartered in both the US and Romania. It's a regular in our group tests and has proven itself reliable over the years.

A standard five-device Bitdefender Total Security subscription is $159.99 per year if you order via the company's website, but the first year's sub for new customers costs $89.99. If you pause for a minute or two on the site, you'll probably be shown a pop-up with an additional discount code that takes it to $XX. A family subscription – with extra parental control options – is $209.99 per year, or $99.99 for new subscribers.

As with many cybersecurity suites, the cheapest way to buy Bitdefender is via a subscription code from a third-party retailer, rather than subscribing directly through the company's own site.

Like most of the products in this group, Bitdefender did well in AV-Test's most recent assessment of home antivirus, correctly detecting 100% of samples in both live exposure tests and a flat file scan of a large set of reference malware samples. It didn't incorrectly identify any benign software as malicious.

While it did reasonably well in AV-Comparatives' latest real-world test – another realistic set of live malware exposures – its percentage blocked score of 98.2% was lower than the score (99.1%) of the version of Microsoft Defender that ships with Windows, our baseline that each security suite has to outperform.

We'd have liked more test results to work with for additional nuance, but SE Labs hasn't tested Bitdefender's home user offering since 2023.

We were a little disappointed to find that the VPN Bitdefender supplies – a white-label version of Hotspot Shield – is limited to 200MB per day, which is somehow less than the standard free version of Hotspot Shield itself, which gives you 500MB. There's no reason to pay for an upgrade to unlimited bandwidth for $50 (this renews at $99.99) when rival VPN providers such as ProtonVPN and Tunnelbear cost similar amounts.

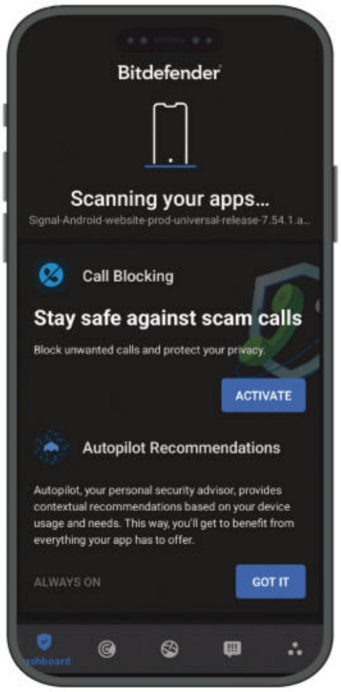
Bitdefender's protection modules include a vulnerability scanner, breach detection for your primary email address, antispam for local email clients (if you're running Outlook or Thunderbird), a ransomware recovery tool that automatically creates a backup of files if it spots ransomware hitting your system, and a firewall that has a slightly slicker interface than the Windows Defender firewall.

Bitdefender Total Security also includes a password manager called SecurePass. It's only available as a browser extension, and while it's functional, if not especially feature-packed, our position is that you're unlikely to change your password manager as often as your antivirus, and should thus pick one that you like and stick with it. Bitwarden and KeePass are both excellent choices.

Other extra tools include a file shredder, system optimiser and anti-theft tools to lock or wipe a lost or stolen device via the Bitdefender Central device management interface. Bitdefender Central – a web interface that shows all your account's active devices – provides better device management features than many security tools offer, allowing you to remotely run scans and see their results. Bitdefender also provides basic breach monitoring for up to two email addresses, but you'll need to upgrade to its Ultimate Security ($109.99 for the first year, $199.99 thereafter) if you want real-time breach notifications.

Its raw detection score isn't enough on its own to justify using it over either Windows Defender or third-party tools

As well as Windows, Bitdefender can be installed on macOS, iOS and Android devices under your licence. The Android app has a fair array of features, including scam and spam call filtering and the same integrated VPN that you get on Windows, but – like many Android security tools – it doesn't allow you to dismiss potentially unwanted program detections if you do, in fact, want the program in question.



Bitdefender

Scanning your apps...

Signal-Android-website-prod-universal-release-7.54.1.a...

Call Blocking

Stay safe against scam calls

Block unwanted calls and protect your privacy.

ACTIVATE

Autopilot Recommendations

Autopilot, your personal security advisor, provides contextual recommendations based on your device usage and needs. This way, you'll get to benefit from everything your app has to offer.

ALWAYS ON

GOT IT

BELOW The Android app includes scam and spam call filtering.

Bitdefender Total Security's malware detection engine will keep you safe against the majority of malicious software that you're likely to encounter, but its raw detection score isn't enough on its own to justify using it over either Windows Defender or third-party anti-malware tools with higher detection rates, such as Avast. The extra features it ships with are also pretty sparse, and we'd have preferred an unlimited VPN.

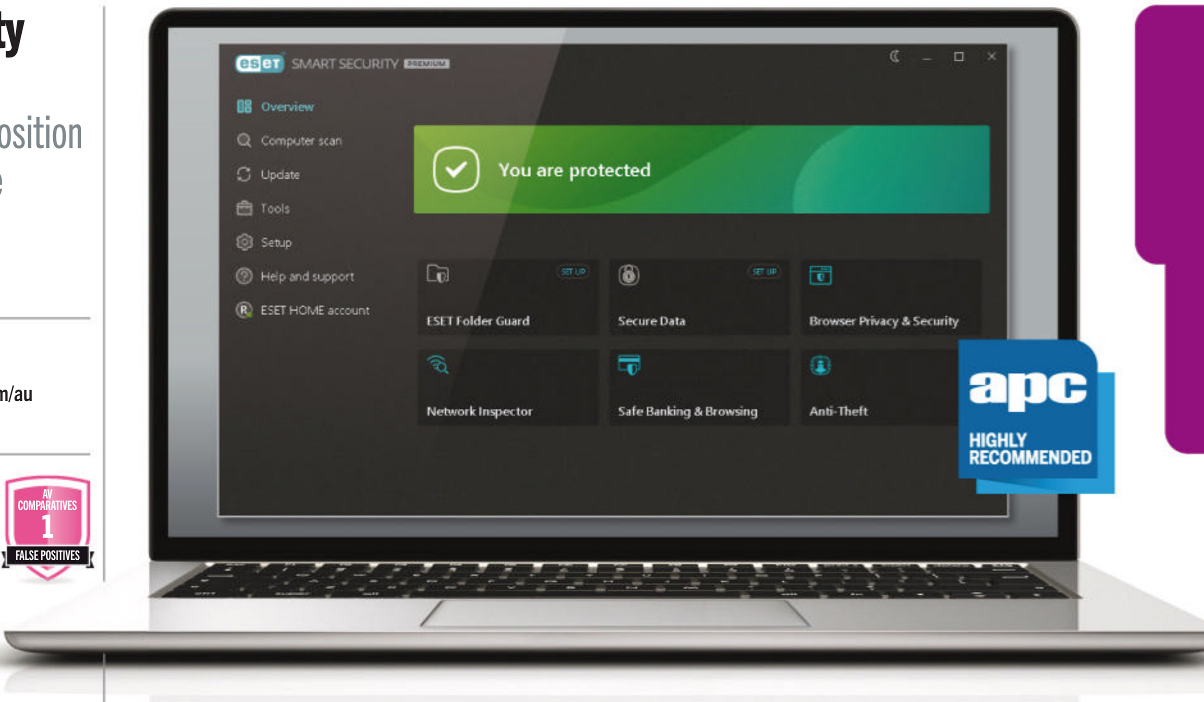
Eset Home Security Ultimate

A strong all-round proposition that also includes a fine VPN, but it's expensive compared to rivals.

SCORE ★★★★☆

PRICE $139 for first year from eset.com/au

AV-TEST 100% PROTECTION | AV COMPARATIVES 99.1% PROTECTION | SE LABS NOT TESTED PROTECTION | AV COMPARATIVES 1 FALSE POSITIVES



Eset was one of several antivirus suites whose malware detection engines put in a perfect performance during AV-Test's real-world malware exposure test, during which PCs are exposed to threats as they would be when encountering them in the wild. Likewise its reference malware sample tests, where the antivirus software is instructed to scan a large set of recent samples of malicious files. Notably, it scored 100% in both tests across two months, with no false positives.

Unfortunately, Eset had a worse time of it in AV-Comparatives' latest real-world protection tests. Its protection score of 99.1% – the percentage of malware blocked – matches that of Windows Defender, which, as the default Windows antivirus that ships with the OS, is the benchmark for malware protection performance in our tests. However, Eset only misidentified one benign test item as malicious, giving it one false positive identification, compared to Defender's three.

We sadly don't have any data about the consumer version of Eset from recent SE Labs tests, as its home version hasn't been tested by the testing house recently.

Eset sells a five-device, one-year subscription for a standard price of $139.99. Normally this is the point where we would tell you to shop around, but Eset is clearly keeping tight control of its licences: while we found the same subscription at that price from Eset's own Amazon shop, we were unable to find keys for Eset Home Security Ultimate at a lower price from any reputable (or even disreputable) seller.

Note that we're not able to tell you how much Eset Home Security Ultimate will cost you if you renew after the first year. While Eset does publish the renewal price for its Premium and Essential products, the price for Ultimate is not shown.

Eset Home Security Ultimate is the top tier of Eset's home offerings, shipping with a VPN, dark web breach monitoring and extra privacy tools, such as automatic metadata removal on photos you upload. It's also the first Eset tier to come with a five-device licence by default, although you can still add extra devices to Eset's Premium and Essential tiers to give you protection for the same number of computers and smartphones – that's if you don't need Ultimate's VPN, which is its most conspicuous extra feature.

The VPN in question is a white-label version of Windscribe, a regular in our VPN group tests, with an excellent reputation for respecting user privacy, campaigning for accuracy within the VPN industry and keeping its own service regularly updated with new features. Although Windscribe isn't the fastest of the major VPN players, it's reliably quick and a strong choice for streaming Netflix et al.

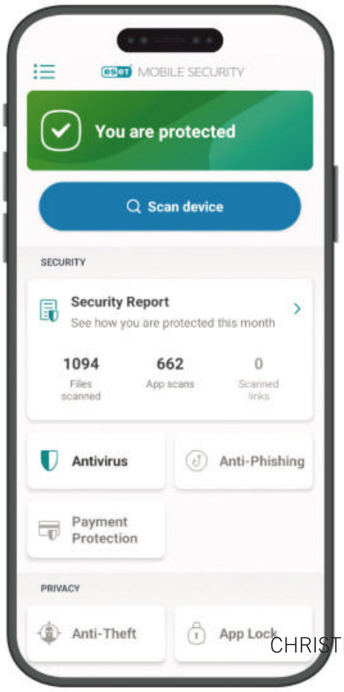
Like Eset Home Premium, Ultimate includes a password manager and an encryption utility for folders and files. Eset Home Essential is the cheapest tier and provides the baseline creature for Eset Home, with core malware protection, a firewall, and safe banking and browser security tools.

Eset has both free and premium Mobile Security apps, both of which have a clear interface and antivirus, but the premium version adds lost device location, payment protection, spam call filtering and more.

ABOVE Eset Home Security Ultimate ships with the excellent Windscribe VPN.

We like Eset's products. Its malware detection wasn't as effective as Avast and Norton, but it at least matches Microsoft Defender

BELOW Eset offers free and premium Mobile Security apps.



Eset is one of a handful of cybersecurity firms that offers a bootable rescue disk in case your PC is infected to the point where you can't boot Windows or run your antivirus. Eset SysRescue disks can be created as Live USB or CD images, although you need to run a dedicated Windows application to create them, rather than simply burning an ISO.

We like Eset's products. The company's malware detection wasn't as effective in recent tests as those of Avast and Norton, but it at least matches the performance of Microsoft Defender, and the extra features that come with the various tiers are worthwhile. Recent versions of the client also include a new high-contrast mode for users with low sight.

However, while most internet security suites can be found at lower prices from third-party retailers and key stores, this doesn't apply to Eset, which keeps rigorous control over its licences. This means that, while you can get a premium subscription to Norton or Avast for around $60, you'll pay $50 to $100 more for Eset's counterpart. And it's just impossible to justify the extra cost.

F-Secure Total

We like F-Secure's interface and its respect for privacy, but its malware detection performance is average.

SCORE ★★★☆☆

PRICE 3 devices, 1yr, US$79.99 **from f-secure.com**

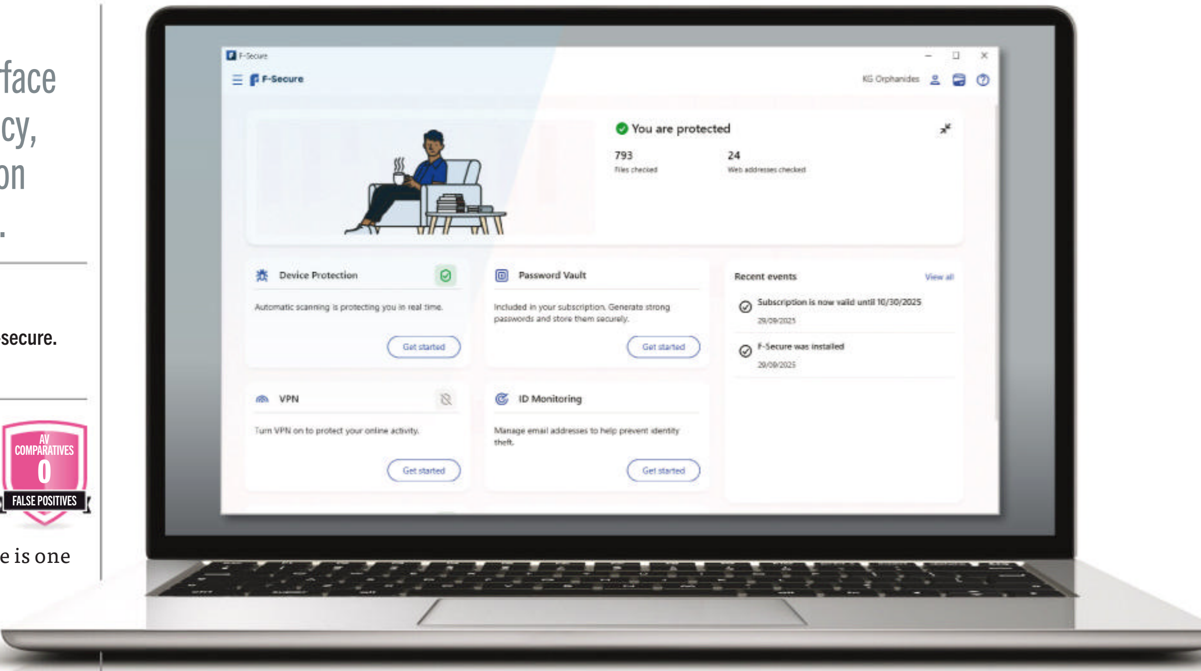
AV-TEST 100% PROTECTION
AV COMPARATIVES 98.8% PROTECTION
SE LABS NOT TESTED PROTECTION
AV COMPARATIVES 0 FALSE POSITIVES

Based in Finland, F-Secure is one of a handful of antivirus firms, along with Eset and Bitdefender, that is based in the EU. F-Secure uses a combination of malware detection engines, including its in-house Capricorn engine and Avira's detection engine, as well as cloud-based analysis for its various scanning and real-time detection operations. It generally does well in tests by AV-Comparatives and AV-Test, and this quarter was no exception: it detected 100% of malicious files in real-time exposure and flat file scan tests by AV-Test, with no false positives, as did many of its rival security suites.

AV-Comparatives' latest real-world (live malware exposure) tests proved more challenging for most participants. Impressively, F-Secure still didn't misidentify any benign files or websites as threats, but it had a protection score of 98.7%. That's among the lowest in this group test, underperforming both Avira Prime (despite sharing its engine) and Microsoft Defender. There's no point in installing third-party software that's less efficient than the service you get for free.

Sadly, we don't have any recent test data from SE Labs about F-Secure's performance, so there's no option for a tie-breaker there, which means it's hard to wholeheartedly recommend F-Secure on the critical basis of malware detection and blocking. It will definitely keep you safe against the vast majority of online threats, but on the most recent evidence it won't do a better job than any of its rivals.

Still, we like the F-Secure client's clean and spacious interface. On first launch, you're prompted to set up various features, such as browser extensions, a password manager, breach alerts, identity theft support and a VPN.



Automatic scanning is protecting you in real time.

Included in your subscription. Generate strong passwords and store them securely.

Subscription is now valid until 10/30/2025
29/09/2025

F-Secure was installed
29/09/2025

Turn VPN on to protect your online activity.

Manage email addresses to help prevent identity theft.

ABOVE F-Secure's nice interface can't make up for sub-optimal performance.

Formerly known as F-Secure Freedome, F-Secure VPN isn't a service that we regularly include in our VPN group tests, but it has always worked well and doesn't keep any identifying information about your use of the service. It's regularly updated with new features, and currently supports the Hydra, WireGuard and OpenVPN protocols, with endpoints in 28 countries.

It's a perfectly fine choice, then, as is the password manager, but if you have specific preferences for VPN or password management tools then you could buy F-Secure Internet Security instead of F-Secure Total. However, the disparity in their features isn't always reflected in their pricing at third-party retailers.

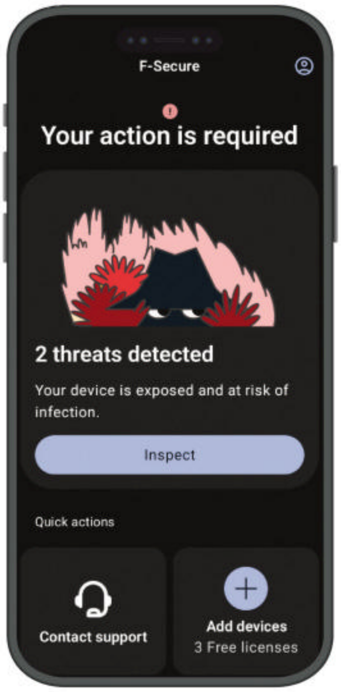
And F-Secure Total is, like many of its rival security suites, much cheaper if you buy it from a third-party retailer and activate the supplied key, rather than subscribing directly from F-Secure. Here, an annual subscription costs US$69.99 for one device, US$79.99 for three devices and US$89.99 for five (note F-Secure is the only suite on test that doesn't have Australian dollar pricing). When you can buy a three-device, one-year sub for around AUD$80 on Amazon there's really no choice. Beyond third-party retailer pricing, there are no discounts for new subscribers – or, to put it another way, no unexpected price hikes for established customers after the first year.

Depending on how many devices your subscription covers, you can add extra computers, smartphones and tablets to your account. These can be either your own or someone else's, and we're impressed by the management interface for secondary users, which include some of the best parental management tools we've encountered in a security suite. These cover content filtering and time management but don't engage in privacy-violating behaviours such as snooping on your children's messages.

> **F-Secure's detection performance doesn't provide any advantage over Microsoft Defender**

The Android and iOS apps provides the scanning for malicious and unwanted files that it promises, but can be oversensitive. For example, when the Android application, like Bitdefender's, flagged a potentially unwanted app – APKPure, which we had installed deliberately on our phone – as a threat, the only option for remediation was to remove it. We couldn't simply close the threat warning by stating that we wished to keep the app.

Because of comparatively strong privacy regulations, we're keen to support antivirus tools made in the UK and EU, but F-Secure's detection performance doesn't provide any advantage over Microsoft Defender and may even perform worse. The extra features it ships with – VPN, password manager, identity protection and parental controls with content filtering – work entirely adequately but fail to stand out in this highly competitive market.



Your action is required

2 threats detected

Your device is exposed and at risk of infection.

BELOW The Android and iOS apps can be a little oversensitive.

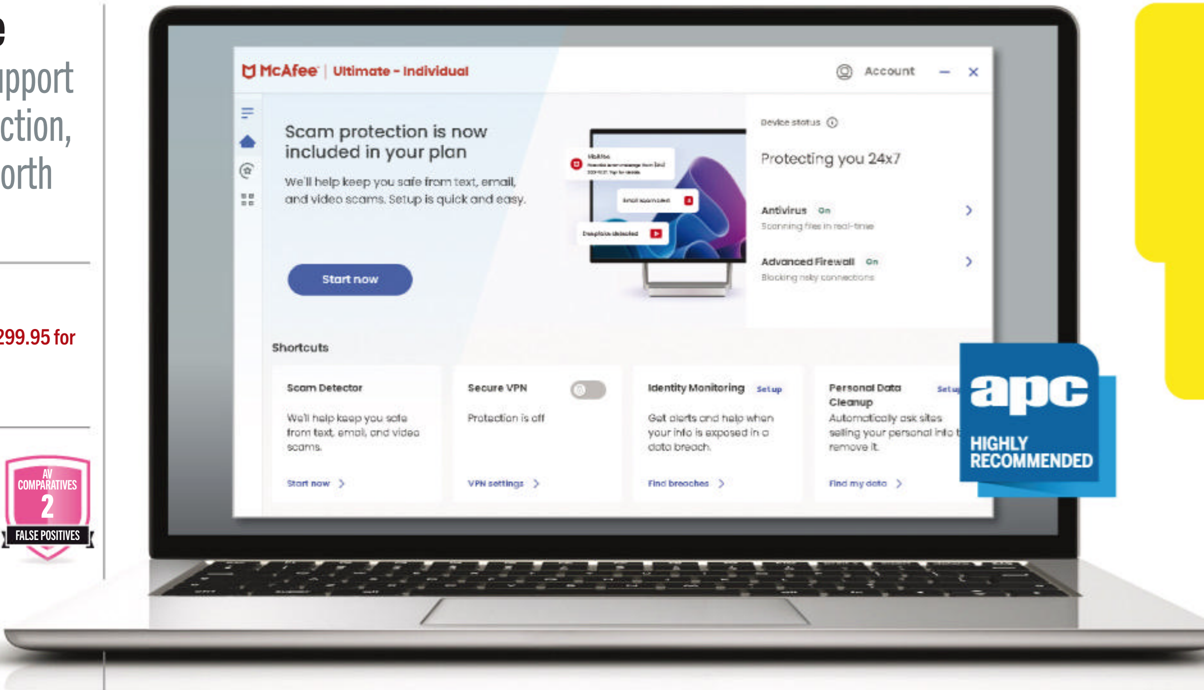
McAfee+ Ultimate

If you want hands-on support and identity theft protection, the McAfee+ range is worth the expense.

SCORE ★★★★☆

PRICE Individual, unlimited devices, $299.95 for first year from mcafee.com

AV-TEST 99.9% PROTECTION
AV COMPARATIVES 99.6% PROTECTION
SE LABS 100% PROTECTION
AV COMPARATIVES 2 FALSE POSITIVES



Scam protection is now included in your plan

We'll help keep you safe from text, email, and video scams. Setup is quick and easy.

Protecting you 24x7

Scanning files in real-time

Blocking risky connections

We'll help keep you safe from text, email, and video scams.

Protection is off

Get alerts and help when your info is exposed in a data breach.

Automatically ask sites selling your personal info to remove it.

apc HIGHLY RECOMMENDED

ABOVE McAfee+ Ultimate adds bags of extra features to justify its high price.

Compared to all the other products here, it may seem ridiculous that McAfee is charging $299.95 for its services, especially as that rises to $399.95 after the first year. However, those heady subscription fees buy you a huge amount of technical support and hands-on services, from assistance in setting up your protection to finding and removing your unused accounts – and having your personal information removed from data broker websites. You also get identity theft and ransomware insurance, along with access to one-on-one support from an identity theft restoration expert if necessary.

If you have a family to protect then a McAfee+ Ultimate subscription costs $449.95 for the first year and $599.95 per year thereafter. That covers unlimited devices for each of six users in your family. At least it's now easier to opt out of automatic renewals for McAfee products, after numerous slaps on the wrist by regulators.

All those extra and costly features are helpful for those with busy lives or those who can't or don't wish to invest the time required to become their own cybersecurity expert. On the other hand, if you like to get hands on with your own security tools and settings, it might be the exact opposite of what you want or need. We also weren't too impressed to find that uninstalling McAfee's Windows client required an old-school removal tool when uninstallation failed via Windows' add/remove programs interface.

At this price it should be no surprise that you get plenty of features for all your devices with a McAfee+ subscription, including a VPN, password manager, file shredder, social media privacy manager (this will help tighten up your security settings across multiple social networks), a firewall that integrates with Windows' firewall as a somewhat pointless supplementary interface, and parental controls with time management, content filtering and device tracking if you have a family account.

When it comes to the important fundamentals of malware detection, in recent years McAfee's engine has been good enough to protect you against most malicious software, but doesn't have the degree of accuracy that we've come to expect from the likes of Avast or Norton. This still holds true, but it's catching up.

McAfee did unusually well in the latest tests by SE Labs, with 100% across the board, meaning that it protected against all malware threats with no false identification of benign programs and websites as threats. This outperforms Microsoft Defender – our reference, as it ships with Windows – by a significant margin.

We were surprised to see it pick up a less-than-perfect score in AV-Test's latest round of testing, dropping to 99.5% accuracy in one of two month-long sets of real-world malware detection tests, but scored 100% across the other real-world exposure test and both months' flat file scans of malware samples to give it an overall score of 99.9%. It didn't make any false positive identifications but slightly underperforms Microsoft Defender here.

While its performance in AV-Comparatives' most recent real-world protection tests wasn't perfect, it again performed better than Defender, protecting against 99.6% of malware exposures with two false positive identifications of benign software, versus Defender's 99.1% protection accuracy and three false positives.

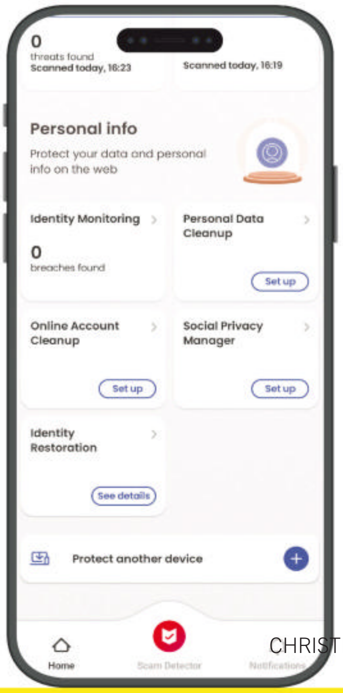
McAfee has committed to identity protection and insurance in a way that few of the consumer antivirus firms have

You can only buy McAfee+ Premium, Advanced and Ultimate plans directly from the company's website. This means that, unlike most of the security suites in this group test, you can't pick up a discounted copy from a third-party retailer. As this is the best source of discounts, it means that McAfee+ Ultimate is definitely the most expensive choice here.

However, McAfee has committed to identity protection and insurance in a way that few of the consumer antivirus firms have, and this makes it difficult to draw a direct comparison between its top-tier product and those of its rivals, as there's a practical and philosophical difference at work here.

If a focus on identity protection and hand-holding support appeals, McAfee+ Ultimate offers a distinct set of features that you won't find elsewhere. But if you're after a standard security and privacy suite, Avast is both a cheaper option and – per current test results – one that offers better protection against malware.

BELOW The highly personalised support includes identity theft insurance.



Protect your data and personal info on the web

Norton 360 Deluxe

A standout choice not only for malware detection but also extra features and value for money.

SCORE ★★★★★

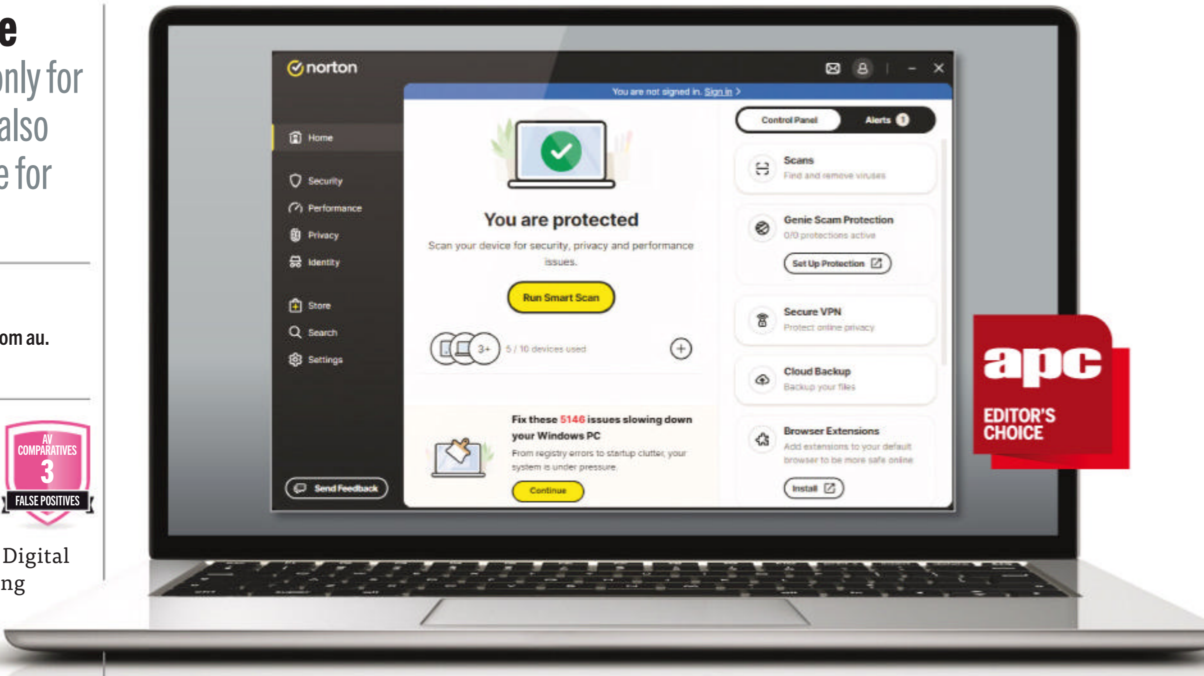
PRICE 3 devices, 15 months, $89.95 from au.norton.com

AV-TEST 100% PROTECTION

AV COMPARATIVES 100% PROTECTION

SE LABS 99% PROTECTION

AV COMPARATIVES 3 FALSE POSITIVES



You are protected

Scan your device for security, privacy and performance issues.

Fix these 5146 issues slowing down your Windows PC

From registry errors to startup clutter, your system is under pressure.

Add extensions to your default browser to be more safe online

apc EDITOR'S CHOICE

ABOVE Norton 360 Deluxe provides superb protection and lots of useful features.

Norton is part of the Gen Digital group, making it a sibling company of Avast, AVG and Avira, but while Avast and AVG share detection engines, Norton and Avira continue to be developed independently. That's good news for anyone who likes choice, especially as Norton's engine is one of the best performers in our aggregation of results from three different anti-malware testing houses.

Norton 360 was one of several antivirus suites to earn a perfect score in AV-Test's latest real-world and flat file-scanning tests, correctly identifying and protecting against all the malicious programs thrown at it, and with no false positive identifications of benign software as potentially malicious.

It also scored a perfect 100% in AV-Comparatives' real-world protection tests, meaning that it blocked every malware sample in a realistic live exposure test of its real-time detection chops, albeit with three false positive identifications. Of the products we selected to include here, only Avast was similarly accurate, although it got two extra false positives.

Finally, Norton earned a 99% protection score from SE Labs, blocking 397 out of 400 malware exposure incidents. The testing house gave Norton a 100% legitimate software accuracy rating. However, if blocking malware counts more to you than never interfering with your installation of benign software, you might weight Avast and McAfee's performance in this test slightly above Norton's, as both blocked 400 out of 400 malware threats.

We tested Norton 360 Deluxe, which gives you support for five devices, plus a VPN, dark web monitoring (this will alert you if your primary email address appears in a breach) and parental controls. The standard price of a one-year subscription is $149.99, although Norton tempts new subscribers with a $89.99 fee for the first year, but be sure to opt out of automatic renewal to avoid a steep price hike. However, the best way to buy Norton 360 Deluxe is via a third-party retailer. If you want to cover more devices than five, consider Norton 360 Premium: this provides two years of cover for five devices for $279.99.

Cheaper tiers – Standard and Plus – only cover a single device. Buy from Norton and Standard costs $104.99 per year, and $79.99 for Norton 360 Plus; these prices drop to $79.99 and $49.99 respectively for new subscribers, with our usual caveats about auto renewals.

Both products include a password manager and varying sizes of cloud backup, plus some machine learning-based AI tools for deepfake and scam detection. Note, however, that deepfake video detection requires a Windows Copilot+-certified PC.

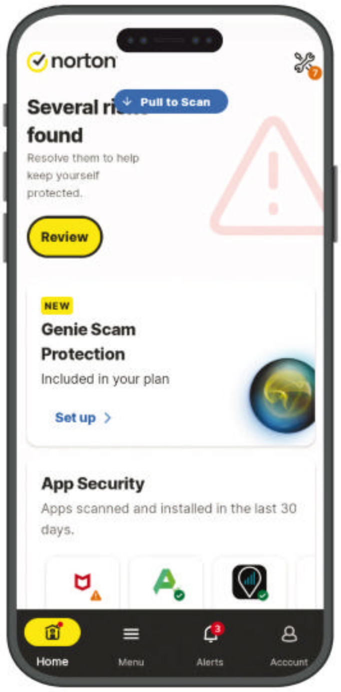
The Genie scam detection tool uses an LLM to parse suspicious images, messages and websites. It's also available as a free app on the web, Android and iOS. There's another freebie, too: Norton Rescue Disk helps you recover a PC rendered unbootable or inoperable due to malware.

Standard subscribers get the same VPN as Deluxe users. Norton's VPN is basic, and never comes at the top of our VPN group tests, but it's a handy addition given the price. We're not especially taken by the password manager. It's functional, but we prefer KeePass and Bitwarden, depending on whether you'd rather manage your password file yourself or leave that to an online service provider.

If you've been looking at the identity protection features of rival McAfee+ Ultimate, you might want to cast your eye over Norton 360 Advanced, which has a standard annual price of $259.99. You don't get insurance or help removing your personal information from data broker sites, but it does add identity restoration support, a credit report and alert service, stolen wallet assistance, and a social media monitoring tool that can provide protection against account takeovers and check for inappropriate or dangerous content. It also includes a financial monitoring tool that can keep an eye on unexpected transactions in bank accounts that you link to it.

Still, Norton 360 Deluxe is the sweet spot option from Norton in our book as it packs plenty of useful features at incredibly low prices. Avast Ultimate takes the edge for its performance in SE Labs' tests and its better-performing VPN, but either program would be a great choice for your household – and some users will be tempted by the generous 50GB cloud backup service that comes with Norton 360 Deluxe.

BELOW The Genie scam detection tool is available as a free app for Android and iOS.



Several ri found

Resolve them to help keep yourself protected.

Genie Scam Protection

Included in your plan

App Security

Apps scanned and installed in the last 30 days.

Trend Micro Maximum Security

Great at defending your PC, but too likely to misidentify legitimate software as a potential threat.

SCORE ★★★☆☆

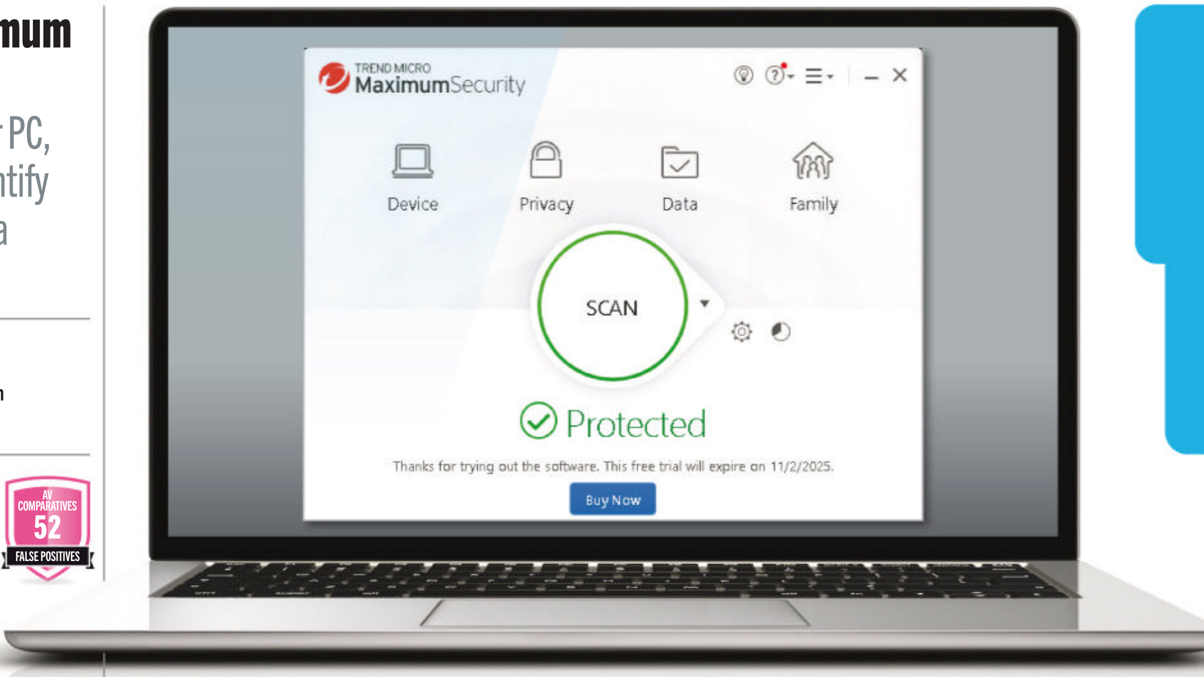
PRICE 5 devices, $49 for first year from trendmicro.com

AV-TEST 100% PROTECTION

AV COMPARATIVES 99.5% PROTECTION

SE LABS NOT TESTED PROTECTION

AV COMPARATIVES 52 FALSE POSITIVES



Thanks for trying out the software. This free trial will expire on 11/2/2025.

Maximum Security is an apt name for this suite. Rather than let any misbehaving file escape its clutches, it's twitchy to the point of paranoia: in AV-Comparatives' test, it picked up a shocking 52 false positives. By comparison, Avast flagged five false positives and everything else here identified three or fewer.

However, it's extremely effective. It blocked 99.5% of genuine malware in the AV-Comparatives test, which is better than Microsoft Defender and most other services. The notable exceptions include our award winners, Avast and Norton 360.

We had to refer back to AV-Test's March/April 2025 results to obtain data for Trend Micro, as it doesn't appear in the latest round of testing. This perhaps reflects the company's growing focus on business AV solutions. Back in April, it earned a perfect protection score in AV-Test's real-world tests, in which a system is exposed to live malware in a natural setting, and its reference tests, where the software scans a set of recently collected malicious files. However, it was also unusual in its detection of false positives in AV-Test's tests: most suites misidentified zero or one as a threat, while Trend flagged five.

SE Labs hasn't included Trend Micro in its recent anti-malware tests. However, it's clear from the data we already have that Trend provides solid protection at the cost of being twitchy about legitimate software. This means it requires more hands-on interaction from the user, and that you'll have to make decisions about whether any given threat alert is accurate or not. Even informed users in a position to do so would probably rather not be bothered so regularly by their antivirus tool, while those who aren't confident could quickly be out of their depth.

Another reason this suite's name is apt is that its US headquarters are in Texas, famed for its prisons, despite being founded in California back in 1988. It also has HQs in Taiwan and Japan, making Trend Micro one of the more multinational firms here.

Its breadth extends to OS support, with ChromeOS available as well as Windows, macOS, Android and iOS. Maximum Security is the company's top consumer cybersecurity suite, and that's reflected in its prices: a five-device licence costs $69 per year as standard, while new subscribers can nab their first year's sub for $49 via Trend's website.

As is the case with most antivirus software, the cheapest way to obtain a licence is via third-party retailers. Here, though, we struggled to find it on "reputable" sites, with our most promising results coming from key-selling site Eneba; we tend to avoid recommending these as we don't know the origin of the codes. However, during testing we found a five-device, three-year licence available for around $20, so buy at your own risk. Incidentally, it doesn't matter if you buy a version of Maximum Security that's older or uses a slightly different name (such as Trend Micro Titanium) - you can still activate it via Trend's website.

If you don't need mobile device support or a password manager (Trend Micro's is nice to use, but we still recommend making a commitment to a specialist password manager such as KeeWeb or Bitwarden), then consider buying Trend Micro Internet Security instead. Its standard subscription price is $79.99, although it can also be found for significantly less via either special offers or third-party retailers.

It lacks 24/7 premium support, which Maximum Security bundles, but both suites give you parental controls. These include screen time limits and content filtering. You also benefit from social media privacy analysis tools and a system optimiser.

Or perhaps you just need the basic antivirus, ransomware protection, email scam protection and secure online payment sandbox, in which case you can save a literal bundle by opting for Trend Micro Antivirus+ Security, with an RRP of only US$33. Note, however, that only Maximum Security supports any operating systems apart from Windows.

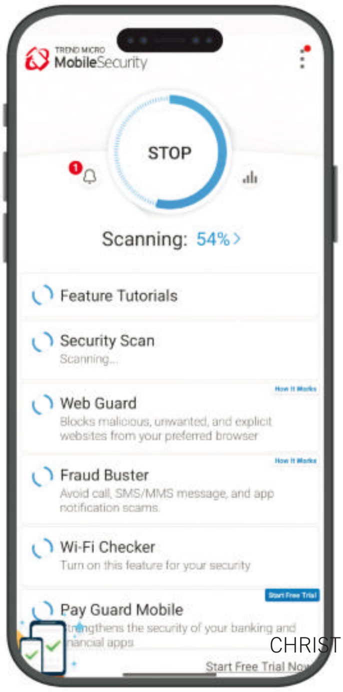
Trend Micro is one of the few antivirus firms that still publishes a bootable rescue disk that allows you to scan your PC when its OS won't boot. The rescue disk tool isn't part of the Trend Micro Maximum Security suite per se, but is freely available for anyone to download.

If it weren't so twitchy about false positives, Trend Micro's clear interface, simple feature set and reasonable costs would make it an easy service to recommend. However, most users don't want to spend too much time interacting with their anti-malware protection, and this keeps Maximum Security off our winners list.

ABOVE Trend Micro has lots going for it, but will require plenty of user interaction.

It's clear from the data we have that Trend provides solid protection at the cost of being twitchy about legitimate software

BELOW Trend Maximum Security supports Android and iOS, plus ChromeOS.



Scanning...

Blocks malicious, unwanted, and explicit websites from your preferred browser

Avoid call, SMS/MMS message, and app notification scams

Turn on this feature for your security

rengthens the security of your banking and nancial apps

The best free alternatives to Microsoft Defender

Installing the best third-party antivirus product not only boosts protection, it also brings some potentially useful features.

When we talk about Microsoft Defender this month, we're talking about the basic out-of-the-box protection that comes with Windows 10 and 11 (not to be confused with the variety of Microsoft's paid-for services by the same name, such as Microsoft Defender for Business). It's pretty good, but it's not currently the best free antivirus around in terms of malware detection and accurate assessment of benign but unknown or obscure software.

We're exclusively covering free antivirus software with a real-time protection component here. This rules out popular antivirus tools such as Malwarebytes Free, which only provides on-demand scanning. This can be useful to sit alongside your real-time malware defences, in case you want a second opinion on a suspicious file, for example, but doesn't meet our requirements that malware protection must be constantly active.

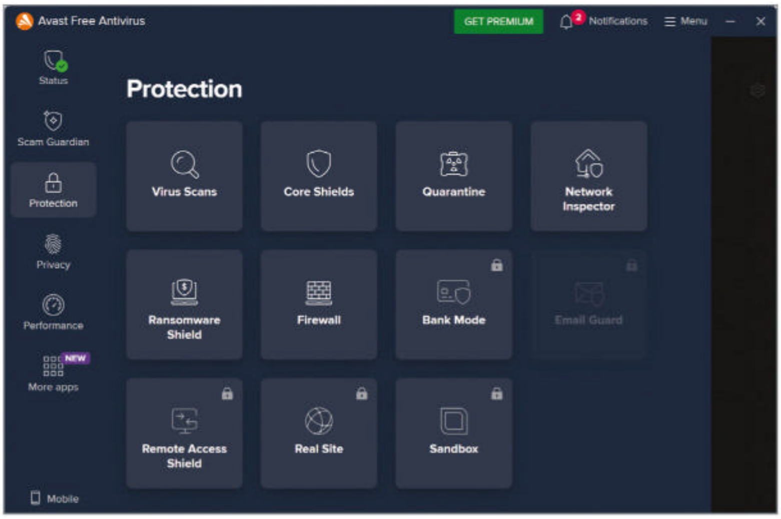
As we've discussed elsewhere, most consumer antivirus suites' core malware detection engines remain consistent between free and paid-for versions. This means you can assume that the results of malware-detection tests carried out by organisations such as SE Labs, AV-Test and AV-Comparatives can be applied to both free and paid-for versions of the same software. And that means the protection performance of Avast (and thus AVG, which uses the same detection engine), Avira and Bitdefender's free offerings is directly comparable to that of the versions shown in our graphs on p74.

This means our pick for best free antivirus is clear: Avast Free Antivirus.

Avast Free Antivirus: our number one pick

Avast is a regular recommendation of ours and has been for years. Although the Czech company merged with US-based NortonLifeLock to form Gen Digital in 2022, its development remains independent from that of its stablemates, which include Norton Antivirus and Avira Free Antivirus.

It provides remarkably effective real-time protection against malware threats, as well as on-demand scanning, a tool that allows you to create a bootable rescue disk, data breach alerts for your email address, a ransomware shield that prevents untrusted applications from modifying (and thus encrypting) your personal files, and Wi-Fi security vulnerability detection. It even supports silent detection, which you can enable in its settings.



ABOVE It may be free, but Avast Free Antivirus provides lots of useful features.

These are the most important features of our Labs-winning Avast Ultimate, although the free version conspicuously lacks the VPN, anti-tracking, Registry and disk space clean-up tools. You also lose webcam protection, the firewall, a sandbox to run suspicious apps and multi-device management.

However, if all you need is no-frills malware detection, Avast Free might even be a better proposition than Ultimate, because of its simplicity. You don't even need to register Avast Free to use it. If you prefer to obtain your antivirus, VPN and PC optimisation tools separately – for example, if you're an experienced PC user with your own opinions about these products – then this simple free antivirus suite is definitely worth your attention.

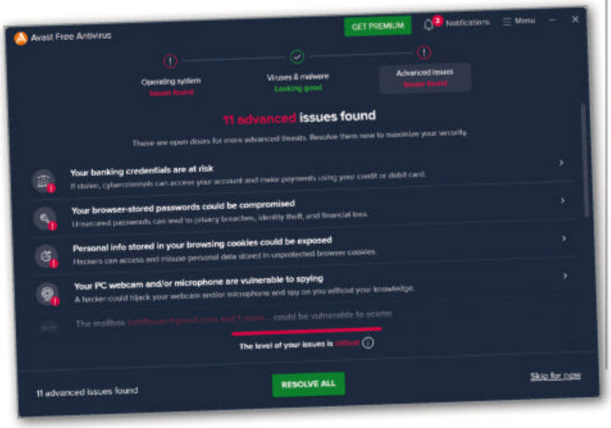
Like its paid-for counterpart, Avast Free has recently introduced an AI-based scam detector. This is built into Avast's Scam Guardian tab in the form of a stringently topic-limited chatbot assistant. You can ask the assistant about specific apps and software packages by name, paste in potentially malicious URLs, as well as images or the text of messages you suspect may be fraudulent. This is helpful in an age of increasingly convincing spam and scam emails that are themselves produced using an LLM such as ChatGPT.

Avast Free is light on system resources and – unlike Microsoft Defender – will run on versions of Windows that are end of life

Avast has also added an AI component to the established Web Guard modules, which warns you about known malicious and fraudulent websites when you're browsing.

While detailed test data doesn't yet exist for the accuracy of Avast's LLM-based components, machine learning has been a key element of malware detection for over a decade. Sadly, we also can't speak to the potential power consumption of Avast's interactive assistant, although its limited subject areas should reduce demands.

Avast Free is available for Windows, macOS, Android and iOS. It's light on system resources and – unlike Microsoft Defender – will run on versions of Windows that are end of life, including Windows 7 and 8. This support for older platforms is by no means exclusive to Avast, but it's definitely worth bearing in mind, as not all antivirus software supports Windows versions below 10.



11 advanced issues found

These are open doors for more advanced threats. Resolve them now to maximize your security.

Your banking credentials are at risk

If stolen, cybercriminals can access your account and make payments using your credit or debit card.

Your browser-stored passwords could be compromised

Unsecured passwords can lead to privacy breaches, identity theft, and financial loss.

Personal info stored in your browsing cookies could be exposed

Hackers can access and misuse personal data stored in unprotected browser cookies.

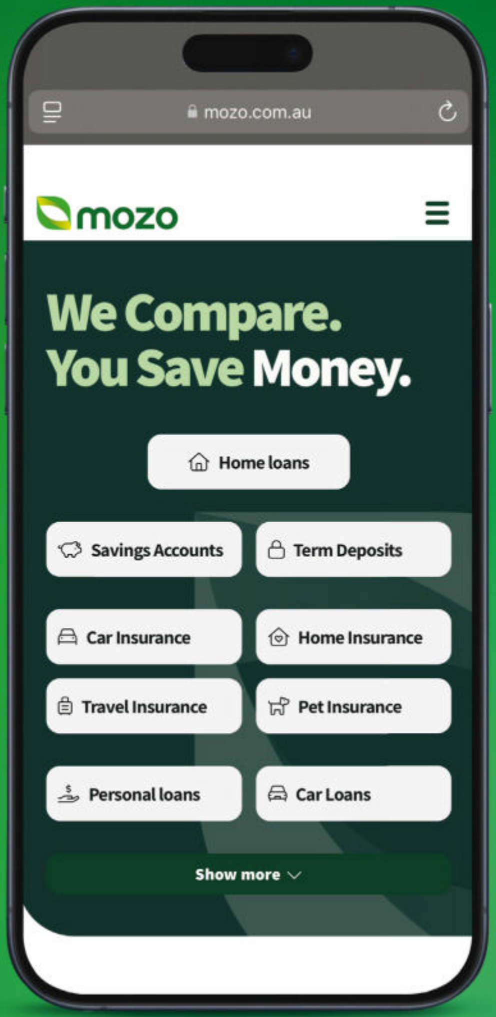
Your PC webcam and/or microphone are vulnerable to spying

A hacker could hijack your webcam and/or microphone and spy on you without your knowledge.

The level of your issues is critical

11 advanced issues found

BELOW You'll have to put up with an element of upselling with most free antivirus products.


mozo.com.au
mozo
We Compare.
You Save Money.
Home loans
Savings Accounts
Term Deposits
Car Insurance
Home Insurance
Travel Insurance
Pet Insurance
Personal loans
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How we test

We get hands-on with every single product in the group test, ensuring that its features and interface all work as they're supposed to and highlighting any friction points. However, long-term testing with live malware samples is required to evaluate how genuinely effective any given antivirus solution is at protecting your system against malicious software.

For this, we turn to data produced by three well-regarded anti-malware testing houses. Specifically, SE Labs in the UK, AV-Test in Germany and AV-Comparatives in Austria. All three publish their test data and methodologies, making them available to the public, as well as the press and industry professionals.

Data for this group came from the following tests: AV-Test Windows 10 antivirus software for home users, June 2025 (**tinyurl.com/APC553avtest**); AV-Comparatives Real-World Protection Test, July-August 2025 (**tinyurl.com/APC553avcomp**); and SE Labs Home Anti-Malware Protection Report 2025 Q2 (**tinyurl.com/APC553selabs**).

We've used the most recent available test data in all cases. Where a specific product isn't tested, we use results for products using the same malware detection engine. In cases where a product has not been tested recently by all labs, we've referred back to historic test data to provide insight into its long-term performance.

In evaluating test data, we place the greatest weight on "real-world" testing, in which antivirus software is exposed to live malware samples in a realistic scenario, such as web exposure, rather than flat file scans of a large collection of malware samples.

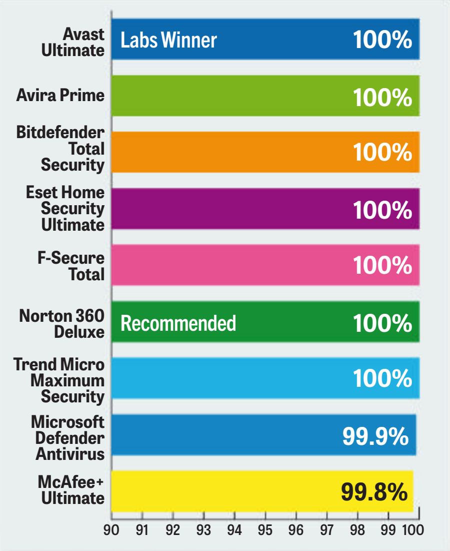
We also take into account performance impacts, measured by AV-Test, and false positive identifications of legitimate software and websites.

SE Labs
INTELLIGENCE-LED TESTING
Endpoint Security
Home
Oct - Dec 2022
EPS PROTECTION

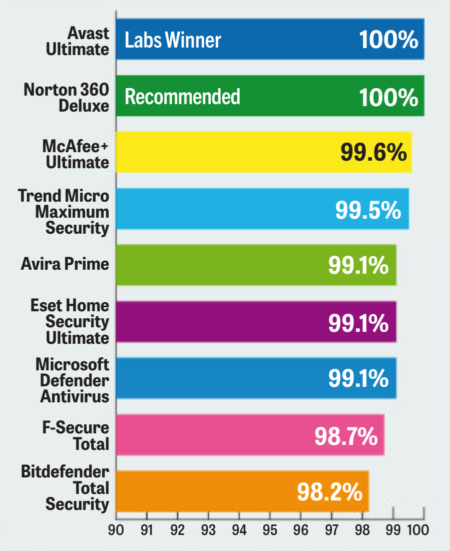
LEFT SE Labs' test results are available to all.

Protection

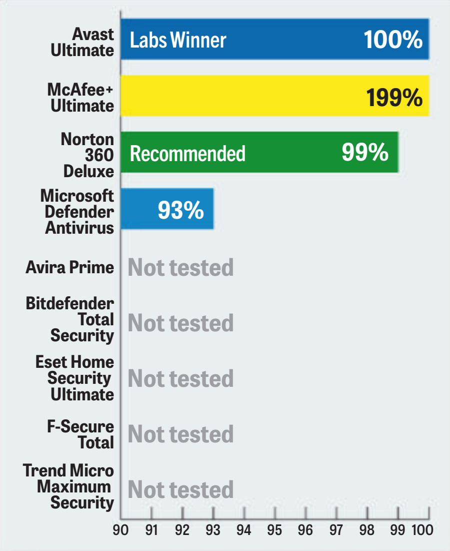
AV–Test real–world tests



AV–Comparatives

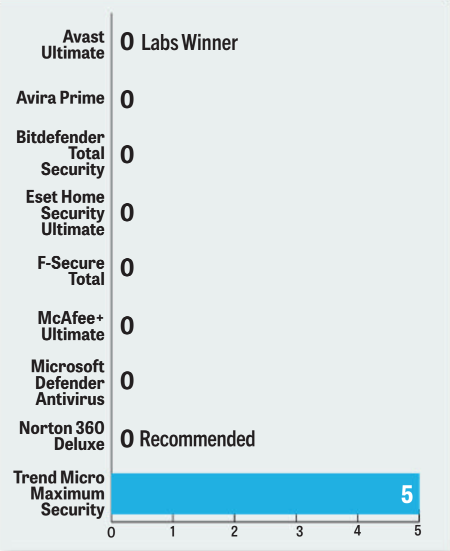


SE Labs

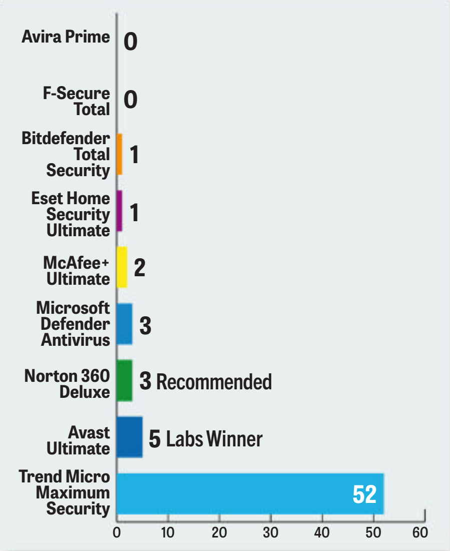


False positives

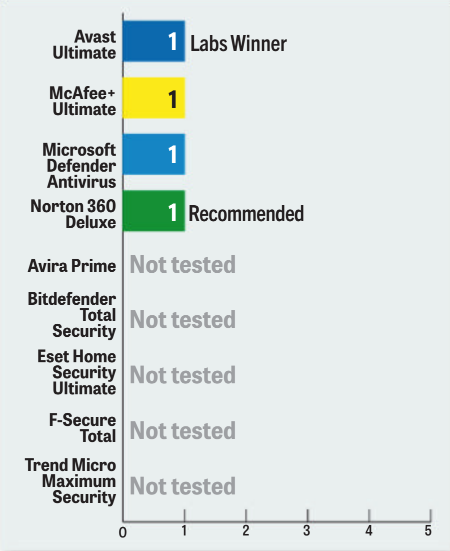
AV–Test real–world tests



AV–Comparatives



SE Labs



View from the Labs

Exactly how useful are the added extras found bundled with security suites?

Most top-of-the-range internet security suites offer a wide range of extra features that purport to keep you safe online, improve your PC's performance or enhance your privacy. But are these just value adds to increase perceived value or genuinely useful?

The current trend, which I've seen in tools such as McAfee Scam Detector, Norton Genie Scam Protection and Avast Scam Guardian, is to bundle an interactive scam and fraud detection tool with the antivirus suite. For now, these are often also available on the web or via mobile apps for free.

The tools typically have a ChatGPT-style interface that allows you to ask anything about the safety of software to the latest security tips. You can also paste in suspicious emails and images for analysis against a machine-learning engine tuned against a corpus of known scam content.

It's impossible to fully assess the accuracy of these scam detection tools, but the limited and predictable nature of scam emails makes their identification a likely candidate for machine learning. Something that's not clear, however, is the amount of power being burned in data centres running these chatbots. Thankfully, the chatbots' topics of conversation are tightly locked down to only respond to queries that directly relate to the topics they're authorised to speak on, and that should mean fewer parameters and thus fewer resources.

KG Orphanides specialises in security topics and provides a quarterly testing service of VPNs at vpndatatracker.com

Some of the most useful extra features you'll find in cybersecurity suites are virtual private networks. VPNs allow you to route your internet traffic via an encrypted tunnel that gives you an entirely different IP address and even geographical location. They're popularly used to prevent local network providers or ISPs seeing your traffic, evade national firewalls and content blocks, and region-shift to another country so you can watch Australian TV while on holiday abroad, or vice versa.

While a few AV firms make their own VPNs – Avast, Norton and F-Secure come to mind – most re-brand white-label services from VPN providers such as Hotspot Shield or Windscribe.

Password managers are also very common, but my position is clear: this tool should be kept separate from other subscriptions.

> **"Password managers are also very common, but my position is clear: this tool should be kept separate from other subscriptions"**

Most password managers I've seen from general cybersecurity firms lack the detailed features you'll find from specialist password managers such as Bitwarden or KeePass, and who wants to switch password managers when they switch security suite provider?

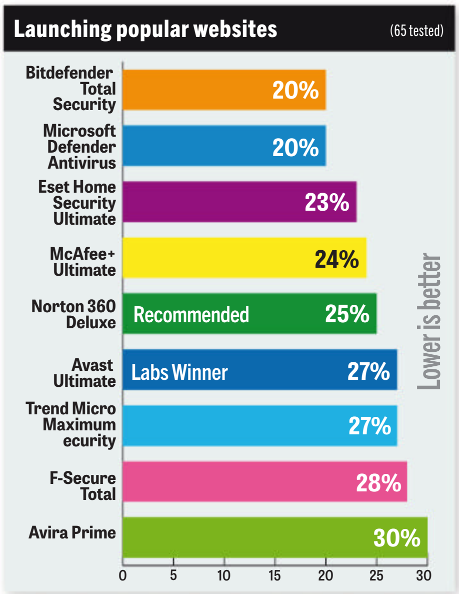
You'll also see a lot of Registry cleaners, disk space optimisers, software updaters, ad and tracking blockers, and browser extensions. These have been part of the security software landscape for years, and while they can be useful, they're unlikely to have a make-or-break influence on your purchase decision, as free and open-source alternatives are widely available.

Identity protection services are increasingly popular, with almost all antivirus providers now offering breach monitoring to alert you if your email address appears in any customer data leaks that appear on the dark web. However, that's a service you can get for free from **haveibeenpwned.com**. More advanced options include social media security analysis tools to help you control who can see your data on the most popular social networks, and full-on identity theft insurance if things go wrong.

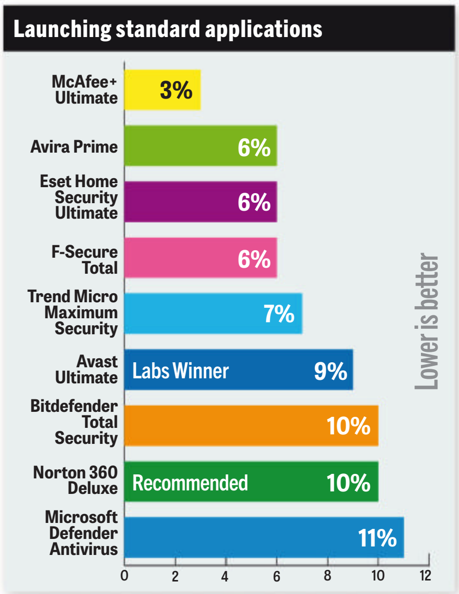
It's worth bearing in mind, though, that if you don't actually want dozens of extra features and apps but simply need reliable real-time and on-demand defence against malware with a minimum of disruption or interaction, the lowest-priced product in any antivirus maker's range will do just that. This includes free software from Avast, Avira and, yes, Microsoft itself. However, that forgettable convenience is one reason why it's important to keep an eye on Defender's performance in tests to ensure that it's still delivering the kind of protection that you need. It's vital to remember that everything else is just an extra. ■

Performance

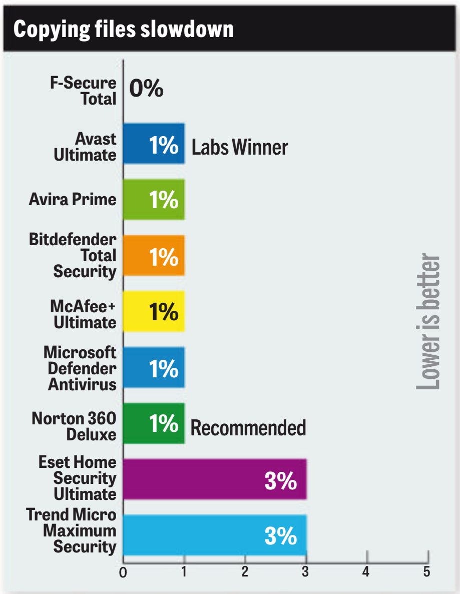
(AV–Test's measured influence on computer speed)



Launching popular websites (65 tested)



Launching standard applications



Copying files slowdown

Find the best deals
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getprice.com/au

The A-List

The best products on the market, as picked by our editors.

Premium laptops

Apple MacBook Pro M4

One of the best laptops that's ever been made.

This M4 update to the already brilliant MacBook Pro line is an easy recommendation, so the big question becomes do you choose the 14in version or 16in. But whatever you choose should last for years, and look great while it's doing it.

PRICE From $2,499 **WEB** apple.com/au

THE ALTERNATIVES

ASUS ZENBOOK A14
This affordable and super-slim laptop with a 14in OLED panel has all the performance most people need at a very competitive price, and it boasts fantastic build quality.
$1,999, asus.com

APPLE MACBOOK AIR M4
If you don't need the all-out power of the Pro, this is a brilliant, cheaper alternative despite the unchanged chassis and screen.
From $1,699
apple.com/au

MICROSOFT SURFACE LAPTOP 7
A shining example of just how good a Windows laptop can be. Despite a few minor drawbacks, the Surface Laptop is a fantastic package that offers performance and battery life.
$1,899, microsoft.com

Business laptops

HP OmniBook X

the qualcomm CPU really delivers.

The latest Qualcomm CPU helps create a standout laptop that will impress compared to Intel powered alternatives. The OmniBook X has been on sale across all major retailers for $2,079. At this sort of price the X is the cheapest Snapdragon X Elite laptop going, and a compelling buy.

PRICE From $2,079 **WEB** hp.com

THE ALTERNATIVES

DELL PRO 13 PREMIUM
Dell's business laptop series has a new name, but its commitment to build quality and astonishing levels of configuration remain the same.
From $2,536
dell.com/en-au

ASUS ZENBOOK S 16
The Asus Zenbook S 16 offers premium performance in the ultraportable category and competes well with alternatives such as the Surface Laptop 7 or Macbook Pro.
$3,499, asus.com.au

LENOVO THINKPAD X1 CARBON GEN 13
The best executive laptop out there, with true all-day battery life. At 1kg and with the latest components, it's worth the price.
From $3,300, lenovo.com /au

Gaming laptops

Alienware m16 R2

A premium and affordable gaming & work machine.

There are cheaper gaming laptops, and faster ones too, but we love the balance offered by the m16 R2. Who doesn't want a big 16in gaming laptop, featuring a Ultra 9 CPU, a RTX 4070 GPU and 32GB of RAM? And for a decent price, considering it's from Alienware.

PRICE $3,300 **WEB** dell.com

THE ALTERNATIVES

LENOVO LEGION PRO 7I GEN 10
A surprisingly elegant chassis considering the power within. Lenovo doesn't put a foot wrong with this.
From $3,749
lenovo.com/au

ACER NITRO V 16
It's a cheap and cheerful gaming laptop, but that's exactly what the Nitro V series does best, and overall this new 16in model offers great bang for buck.
$1,500
store.acer.com

ASUS ROG ZEPHYRUS G14 (2025)
AMD's Ryzen AI 9 HX 370 CPU combined with the RTX 5080 GPU in this slimline chassis complete with 14in OLED panel.
$6,999, asus.com

Everyday laptops

Lenovo Yoga Slim 7x

A beautiful machine that combines style, great tech and strong value.

Lenovo fought off all-comers in our most recent group test due to its all-round quality – we love the slimline, blue, all-metal design and 14.5in OLED panel – and the fact that its battery keeps this 1.3kg laptop going for over 20 hours. It's a great advert for Qualcomm's Snapdragon X Elite chips.

PRICE From $1,949 **WEB** lenovo.com/au

THE ALTERNATIVES

ASUS VIVOBOOK S15
This affordable laptop still includes an all-metal shell and 15.6in OLED panel, saving money by using a solid 8-core Snapdragon X Plus chip.
$1,999, asus.com

MICROSOFT SURFACE PRO (X ELITE)
The versatile top of the line Surface Pro 2-in-1 sports the 12 core Snapdragon X Elite. Its OLED screen is stunning.
From $2,699, microsoft.com

MICROSOFT SURFACE LAPTOP 13-INCH
Another Microsoft laptop powered by a Snapdragon chip, but it's low power so this stylish laptop is best for less demanding tasks.
From $1,358, microsoft.com

Chromebooks

Asus Chromebook Plus CX34

A sleek and relatively affordable ChromeOS workhorse, the Asus Chromebook Plus CX34 delivers strong performance and features at a competitive price when on sale, and is ideal for budget-conscious users.
$699, asus.com

Lenovo Flex 3i Chromebook

This isn't the most powerful Chromebook, but students need reliability more than power – especially if they're only really using it for homework, note-taking, and perhaps the occasional bit of Netflix.
$367, lenovo.com/au

Lenovo IdeaPad Duet

The Chromebook answer to Microsoft's Surface tablets, this is a seriously versatile device – albeit not the speediest (although we never found it to be painfully slow while carrying out everyday tasks). For this price, and with a 16hrs 14mins battery life, the Duet is a great choice.
$297, lenovo.com/au

Tablets

Apple iPad Air (M3)

It's hard to be too excited by this update as it's exactly the same design but with an M3 chip inside. But when the original was so damn good, whether in 11in or 13in variants, and Apple Intelligence is thrown in, it remains the best choice for the vast majority of tablet buyers.
From $999, apple.com/au

Apple iPad Pro (M4)

The best tablet in the world becomes even better thanks to Apple's stunning M4 chip, a gorgeous OLED screen and the must-have accessory: the all-new Pencil Pro. But it comes with an obvious downside of cost, with the cheapest 13in incarnation costing $2,199.
From $2,199, apple.com.au

Samsung Galaxy Tab S9 Ultra

This 14.5in tablet offers a size and versatility that even the iPad Pro can't match, with its high price more than justified by the quality of Samsung's AMOLED panel, speakers and productivity software.
$1,999, samsung.com

Everyday & gaming monitors

Asus ROG Swift OLED PG32UCDP

We've seen several ultimate gaming monitors in recent months but, from the specs alone, Asus might just have made the most *ultimatest*: 480Hz refresh rate, matte-screen HDR OLED, 32-inch 4K.
$2,399, rog.asus.com.au

NEW Asus ROG Swift OLED PG27AQWP-W

With twin OLED panels, this raises the bar for speed, brightness and longevity... albeit at the expense of text clarity, making this one unsuitable for productivity, but unbelievably good for gaming. **$$1,999, rog.asus.com**

LG UltraGear 45GX950A

This doesn't settle for anything less than being the best. Operating an enormous 5K/2K resolution with a 165Hz/330Hz refresh rate, the UltraGear satisfies the needs of competitive and cinematic gamers alike – at a fairly high cost.
$3,499, lg.com

Professional monitors

Asus ProArt Display 6K PA32QCV

Asus' 6K professional display aims to deliver uncompromising performance to creative workers. Image and video editing is a joy thanks to all the screen real-estate and it's generally brilliant to interact with.
$2,499, asus.com

BenQ DesignVue GW2730S

A great choice for creative professionals and demanding users alike, and if your budget can take it why not daisy-chain two together over Thunderbolt? You'll love the image quality and 5K resolution.
$459, eizoglobal.com

MSI Modern MD342CQPW

A high-quality panel that includes all the features most people need. Sure, it could go brighter and it lacks USB-C ports and RJ45 networking, but it packs quality exactly where it counts.
$699, msi.com

Home office printers

HP OfficeJet Pro 9130e

This versatile inkjet all-in-one – which includes a 35-page ADF – pumps out high-quality prints at laser-rivalling speeds. Likewise scans and copies. Print costs are reasonable, too.
$248, hp.com

Canon i-Sensys LBP243dw

Everything you could want from a mono laser printer – it doesn't come with a scanner – the LBP243dw produces excellent results at speed. You also get Wi-Fi and wired networking.
$479, canon.com

Brother MFC-J4540DW

Home workers will love this inkjet all-in-one. It combines an incredible range of features with all the connectivity you need and extreme ease of use. Output quality is fine, it offers the best cloud support around and the high-capacity ink pack could keep you going for years.
$329, brother.com

Find the best deals
on new gear at
getprice.com/au

Wireless routers

Asus RT-BE92U

A premium, consumer-grade Wi-Fi 7 that doesn't cost the Earth. The Asus RT-BE92U doesn't put a foot wrong. It's fast, feature-packed and it even looks good too. At $424 it's also excellent value and is our new Editor's Choice.
$424, rog.asus.com/au

Netgear Nighthawk RS100

Don't be put off by the low price – the RS100 gives you a very viable Wi-Fi 7 service, without making you pay for high-end features and performance you don't really need.
$199, netgear.com/au

TP-Link Archer BE550

This is a brilliant mid-range choice thanks to a 6GHz radio and five 2.5GbE ports – you'll enjoy superb wired and wireless performance, and it even comes with a wide set of features. It's priced well and looks fabulous
$398, tp-link.com

Mesh Wi-fi

TP-Link Deco XE200

There are cheaper Wi-Fi 6E meshes, but the XE200 wins for its superb download speeds, excellent coverage and the fact that older clients reap benefits of 6E, not just new ones. And a two-pack should be enough for most premises.
$1,299 (2-pack), tp-ink.com

TP-Link Deco X20

The Deco X20 makes it possible to upgrade your home network to Wi-Fi 6 for the price of some standalone routers. The HomeCare functions are also a great bonus for households where lots of devices are fighting over the bandwidth. **$227 (2-pack), tp-link.com**

Asus ZenWiFi AX

The interface and design certainly aren't the prettiest (the charcoal version is straight out of the 1980s), but if you're after strong performance, great features and plenty of expansion potential, the ZenWiFi AX is a compelling prospect.
$939 (2-pack), asus.com/au

NAS servers

Asustor Nimbustor 4 Gen2 AS5404T

A particularly strong choice as a media server, the updated Nimbustor 4 is both flexible and quick. Asustor's Nimbustor 4 AS5404T is a four-drive NAS enclosure aimed at demanding home users or small offices.
$879, asustor.com

Synology DiskStation DS925+

Casual NAS users will find better value elsewhere. However, access to the vast, polished and professional Synology ecosystem will more-than justify the high price to buyers who make use of it.
$1,099, synology.com

Qnap TS-264

The Qnap TS-264 is aimed at those who want a bit more from a traditional two-bay NAS. It's effectively the two-bay version of the excellent four-bay TS-464, and provides strong speeds over its pair of 2.5GbE ports – and includes two M.2 NVMe slots.
$729, qnap.com

Security software

Avast Ultimate

Buy from retail and this is a bargain, with a solid VPN, anti-tracking software and handy detection fees on top of excellent protection.
~$65, 1 device, avast.com/en-au

THE ALTERNATIVES

NEW **NORTON 360 DELUXE**
A standout choice not only for malware detection but also extra features and value for money. It packs plenty of useful features at low prices.
3 devices, $89.95, au.norton.com

NEW **AVIRA PRIME**
Performed well in recent tests and will certainly protect you against the vast majority of malware found in the wild, though the free version will cover many users' needs. **5 devices, $80.95, avira.com**

NordVPN

NordVPN provides consistent and fast speeds, serious security, great support for video-streaming services and some cost-effective subscription rates.
$59 per year, nordvpn.com

THE ALTERNATIVES

PROTONVPN
ProtonVPN provided one of the best free offerings of all the VPNs in our group test, including unlimited data, but upgrade to benefit from even faster speeds and many more options.
Free, protonvpn.com

SURFSHARK
A strong rival to NordVPN, especially if you're willing to commit to its two-year contract. It's fast, cheap and a fine choice for people who like to switch to US streaming services.
$79.61 for one year, surfshark.com

Bitwarden

Bitwarden has a huge advantage: it's free. It isn't as slick as some paid-for rivals, but it can sync passwords across all devices for no extra charge. **Free, bitwarden.com**

THE ALTERNATIVES

DASHLANE
A manager that's ideal for beginners, and it even builds in an unlimited (if basic) VPN service. Note you may prefer to buy the Family plan ($60 per year) as this extends the service to six people.
$55.99 per year (Premium), dashlane.com

1PASSWORD
1Password is targeted at users who are looking for the last word in security. It even offers a Travel Mode that may ease your mind if surrendering your phone to customs officials.
$54.99 per year (individual), 1password.com

Market Watch

Mark Williams spotlights representative PCs in the market today.

PRICE $2,799 **WEB** tinyurl.com/APC553rad

RADIUM PC MSI MAG RTS ELITE

As this month's cheapest pick in the roundup, this system gets there with previous-gen parts: the Ryzen 7 7700 and RTX 4070. Both are well matched for gaming and will let you comfortably play at 1440p. Being roughly 10% behind the RTX 5070 found in the Photech system, while being just 5% cheaper, means this isn't the best bang for your gaming dollar.

However, to offset that price, there's a big 1000W PSU and 360mm AIO cooler. Both are overkill, but they give you more options later.

Not purely the best out of the box, it could be great for those on a budget with an eye towards upgrades later.

SPECS **CPU** AMD Ryzen 7 7700; **Cooler** Nzxt Kraken Elite V2 360mm AIO; **Motherboard** MSI B650M Mortar WiFi; **Graphics** MSI RTX 4070 Ventus 12G OC; **Memory** 32GB DDR5 6000MHz; **Storage** 1TB Crucial P310 Gen4 M.2 SSD; **Power Supply** Antec 1000W; **Case** MSI MAG Pano M100R PZ.

PRICE $2,946 **WEB** tinyurl.com/APC553pho

PHOTECH BLACKOUT RYZEN

Coming in 5% dearer than the Radium PC, but offering 10% more gaming performance, thanks to the newer RTX 5070, it's a wonder this machine doesn't cost more, considering it has double the SSD capacity at 2TB. It does have a more reasonable PSU to aid the price, but its likely the complete lack of RGB fans that saves the pennies here.

Using a case that includes sound-dampening material to give the quietest PC you possibly can get, there's no need for pricey RGB fans to look good.

If you don't care about looks, and more importantly care about the amount of noise your system generates, this is a great option to consider.

SPECS **CPU** AMD Ryzen 7 7700; **Cooler** Thermalright Royal Knight 120; **Motherboard** MSI B650 Gaming Plus Wifi; **Graphics** Palit GeForce RTX 5070 Infinity 3 12GB; **Memory** Klevv FIT V 32GB 6000MHz CL28 DDR5 RAM; **Storage** 2TB Crucial P3 Plus Gen4 M.2 NVMe SSD; **Power Supply** FSP VITA GM 850W; **Case** Phanteks XT Silent.

PRICE $3,199 **WEB** tinyurl.com/APC553cent

CENTRE COM DELTA II

Competing on the same level as the JW system, this performs an impressive feat of delivering the most graphics horsepower this roundup, whilst not being the dearest. Touting the RTX 5070 Ti, this offers up around 17% more gaming performance than the JW system does. The matched CPU will bottleneck the GPU in some situations, so consider this system if you tend to run games with all the shiny graphical details turned up, rather than the other way around. The cooler, SSD and PSU are all adequate here, same with the 32GB of RAM. A solid build at a good price.

SPECS **CPU** AMD Ryzen 5 7500F; **Cooler** Thermalright Assassin X120 Refined SE ARGB; **Motherboard** Gigabyte B650M Gaming Plus Wi-Fi; **Graphics** Gigabyte GeForce RTX 5070 Ti Gaming OC 16GB; **Memory** 32GB Team Group T-Force Delta RGB DDR5 32GB 6000MHz CL38; **Storage** 1TB WD Blue SN580 PCIe Gen4 NVMe SSD; **Power Supply** Cooler Master GX II 850W; **Case** Cooler Master MasterBox 600.

PRICE $3,299 **WEB** tinyurl.com/APC553jw

JW COMPUTERS GMR VULCAN 9070

Being the dearest of the bunch, it's hard to see where the extra money is going. The graphics card alone is about $350 cheaper than the RTX 5070 Ti, there's a smaller 1TB SSD and PSU too. The RAM has slightly tighter timings, but nothing to write home about. With a similar 120mm air cooler, motherboard and CPU, it's pretty hard to justify the cost of this system.

It's by no means bad; it has 16GB of VRAM to maintain better future gaming performance and will perform decently at high-refresh-rate 1440p gaming. JW Computers, however, shouldn't be setting this price while offering basically less. Only consider if it's on discount.

SPECS **CPU** AMD Ryzen 5 7500F; Cooler NZXT T120; **Motherboard** Asus Prime B650M-A Wifi II-CSM; **Graphics** Asus Prime RX 9070 16GB OC; **Memory** 32GB G.Skill Ripjaws M5 Neo RGB DDR5 6000MHz; **Storage** 1TB WD Blue SN580 PCIe Gen4 SSD; **Power Supply** Cooler Master MWE V2 750w; **Case** Inwin F3 White TG.

YOUR NEXT PC

BLUEPRINTS

Build the best PC for your budget

BUDGET
ADVANCED
MID-RANGE
NZXT

KEY

Budget build

Pick these parts if you want to build a new, well-rounded PC for a good price.

Mid-range build

For productivity power and running every new game at 1080p 60fps. This recommended build will see you through.

Advanced build

You're looking for the best PC on the market and superior components. But you still want to spend smart.

BUDGET BUILD

Enjoy 1080p gaming and most tasks without breaking the bank.

TOTAL
$2,044

MOTHERBOARD

NEW ENTRY

TUF Gaming B650 Plus WiFi

Asus $269

This board doesn't skimp on features, which means it's the perfect starting point for an AM5 rig, with room to upgrade.

PROCESSOR

NEW ENTRY

Ryzen 5 7600X

AMD $339

It's a hot runner, but this budget AMD chip provides six cores of genuine gaming grunt for a very reasonable sum.

GRAPHICS CARD

Radeon RX 9060 XT 8GB

AMD $499

AMD delivers what we need for a 1080p gaming PC at a solid price, at least until even more budget GPU competition arrives.

COOLER

NEW ENTRY

Peerless Assassin 120 SE

Thermalright $69

One of the best performing air coolers we've ever tested. It runs whisper silent and is remarkably good value.

MEMORY

Fury Beast 16 GB (2x 8GB)

Kingston $115

We've made the switch to DDR5 here, as DDR4 is a bit old fashioned in 2025 and cheap kits are plentiful.

POWER SUPPLY

Pure Power 12 750W

Be Quiet! $179

This 750W power supply gives you a decent dose of headroom for some future upgrades, from a trusted manufacturer.

SSD

SN7100 1TB

Western Digital $139

It's time to ditch SATA and go for an NVMe drive, even for a budget PC. You'll appreciate the extra speed and fast boot times.

CASE

NX200M

Antec $65

This Antec will let your components breathe and has space for further expansion and cooling.

DISPLAY

Gaming 27G4

AOC $164

AOC make some surprisingly cheap and well-specced little gaming monitors, like this 27in 180Hz 1080p display.

KEYBOARD

C3 Pro Wired

Keychron $59

It's actually mind blowing what you can pick up for this little cash: a USB mechanical board that looks lovely.

MOUSE

G305 Lightspeed

Logitech $69

Even on a budget you can still grab a fantastic, ultra-rapid wireless squeaker like this one here.

HEADSET

HS55 Stereo

Corsair $59

CorsaIr's budget wired cans are comfy and have a surprisingly excellent microphone for the money.

MOUSE PAD

MM100

Corsair $19

A simple black rectangle that can make a world of difference over no-name models, and it's almost as cheap, too.

MID-RANGE BUILD

Our recommended build for solid productivity and playing the latest games.

TOTAL

$3,477

MOTHERBOARD

TUF Gaming B650-E
Asus $299
A reliable motherboard with plenty of frills, including Wi-Fi 6E, 2.5Gb Ethernet, PCIe 5.0 for the SSD and USB-C on the back.

PROCESSOR

Ryzen 7 7700X
AMD $529
For the longevity offered by the AM5 socket, we're going for AMD's excellent eight-core Ryzen 7.

GRAPHICS CARD

RTX 5070
NVIDIA $900
The RTX 5070 can now be found for a reasonable price, and its DLSS support tips the odds over the AMD competition.

COOLER

Peerless Assassin 120 SE
Thermaltake $69
More than good enough for both budget and mid-range builds, this chunky air cooler is undeniably impressive.

MEMORY

Vengeance RGB DDR5 (2x 16GB)
Corsair $199
A sleek RGB DDR5 kit that gives solid performance for the price, running at 6000MT/s, which is perfect for the CPU in this build.

POWER SUPPLY

Pure Power 12 M 750W
Be Quiet! $179
This larger Be Quiet! PSU offers a stable platform with PCIe 5.0 connectivity. At 750W, there's room for a GPU upgrade too.

SSD

SN7100 2TB
WD $299
Upping the capacity to 2TB over the budget build means there's now plenty of spare room for many, many games.

CASE

H7
Nzxt $179
It's very clever of Nzxt to design such an easy PC case to build into, and make it look so gorgeous too.

DISPLAY

MPG 275CQRXF
MSI $479
The price of this MSI, considering the 1440p resolution, curve and 240Hz refresh rate, is quite something.

KEYBOARD

K855 Wireless TKL
Logitech $119
You could spend more for a full-size keyboard, but this mechanical Logitech will certainly suffice for most people.

MOUSE

DeathAdder V2 X Hyperspeed
Razer $59
The regular V2 is great if you can find one, but this version delivers impeccable gaming performance for less.

HEADSET

Cloud Alpha
HyperX $140
We're still not over the awesome audio quality and excellent comfort of the HyperX Cloud Alpha.

MOUSE PAD

G440
Logitech $27
This low-friction hard-top mouse pad with minimal branding offers the smoothest of glides for a reasonable price.

ADVANCED BUILD

Go above and beyond with a PC powerful enough to tackle anything.

TOTAL

$8,387

MOTHERBOARD

MAG X870E Tomahawk

MSU $569

With support for four M.2 drives, huge amounts of DDR5, Wi-Fi 7 and more, this mega mobo is specced to the hilt.

PROCESSOR

Ryzen 7 9800X3D

AMD $889

The top-tier Zen 5 X3D models will have more cores, but for gaming and most uses this is the bee's knees.

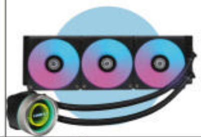
GRAPHICS CARD

GeForce RTX 5080

Nvidia $1,740

The RTX 5090 is ridiculously expensive, so we're recommending the RTX 5080 instead, but if you can afford a 5090 go for it.

COOLER



Galahad II Trinity 360

Lian Li $249

Lian Li's Galahad is all about pure liquid cooling performance and it delivers this flawlessly.

MEMORY

Vengeance RGB DDR5 (2x 16GB)

Corsair $399

Corsair looks to have the best memory prices and stock in hand at the moment, but definately shop around.

POWER SUPPLY

Prime PX-1300

Seasonic $499

This PC is a thirsty beast, so you'd better give it a serious power supply – and this one's similarly monstrous.

BOOT DRIVE

NM790 4TB

Lexar $368

With 4TB of storage, it's going to take one seriously big Steam library to get anywhere close to filling this drive up.

MOUSE PAD

Firefly V2 Pro

Razer $169

Do you need an RGB mouse mat? If it makes you feel any better it's excellent for flick shots.

CASE

5000D

Corsair $189

We swear this stylish mid-tower is bigger on the inside. It's the PC equivalent of the TARDIS.

DISPLAY

ROG Swift OLED PG32UCDM

Asus $2,229

You could be much more sensible on your screen than this. For this build, however, we only want the best.

KEYBOARD

Vanguard Pro 96

Corsair $349

An outstanding typing experience, and packed with features that would make even the most exacting gamer happy.

MOUSE

ROG Harpe II Ace

Asus $239

Its astonishing light weight is pure delight to use for gaming. Some may prefer a heavier mouse for productivity work, though. We love it.

HEADSET

Maxwell

Audeze $499

Planar magnetic drivers make this headset pure heaven for audio fans. And everyone else, to be honest.

WORKSHOPS & TIPS

Easy-to-follow workshops and expert tips

WORKSHOPS IN THIS ISSUE

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Synchronise files across your home network

Nik Rawlinson likes to share.

IT WILL TAKE
One hour

YOU'LL NEED
Syncthing

The great thing about online storage services like Dropbox is that they 'just work'. Once you've installed the software, they get on with the job for years. Unless you run out of space, that is, at which point you may need to remove items or pay for an upgrade.

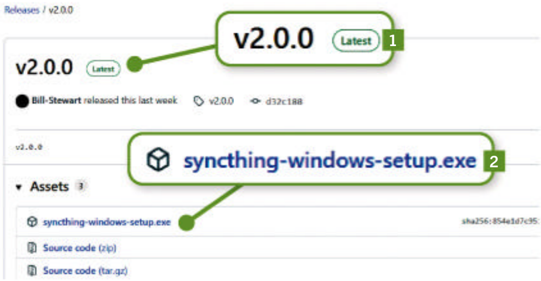
Dropbox offers 2GB for free, which is pretty generous, but you could easily fill that up. Alternatively, you could opt for Mega, which gives you up to 20GB on its free plan. However, it states that transfers on the free account are 'limited' without explicitly explaining what that limit is (see **https://mega.io/pricing**).

Another solution is to set up your own cloud backup service that runs on your home network. It's safer too. We have no reason to doubt the security of Dropbox, Mega and others, but the more often you send files across the internet, the greater the risk that one day they'll be intercepted or leaked online. Keeping everything local on your network reduces that risk.

And in most cases this won't require more drive space than uploading to the cloud. When you sync files online, you aren't usually removing them from your computer (although some services offer this). More often, you're storing them in a specified, synchronised folder on your PC that's replicated in the cloud. From the cloud, it's then downloaded by every other device logged into the same account.

Hosting your own sync service at home cuts out the online stage, and instead shares the files directly from one machine to another. And because you're using your own hardware, the only limit to what you can share is the available free space on the drives you're syncing.

There are drawbacks. You won't be able to access previous versions of a file – a process called versioning. And you'll also need to make sure the software you use to sync your files is up to date if you're going to manage it yourself. This isn't something you need to think about when using cloud services where it's managed and updated by a third party.



Click 'syncthing-windows-setup.exe' to download the Syncthing installer.

Fortunately, the tool we're using to set up our sync network – Syncthing – can check for and apply updates automatically. It's also free to use, with no hidden catches.

1 INSTALL AND SET UP SYNCTHING

Syncthing runs in the background on each of the machines you want to sync files between. It then watches out for changes on other computers in the network and – when it spots them – updates its own folders to match.

So you'll need to install Syncthing on every machine you want to synchronise, but for the moment choose just one of them and visit syncthing.net/downloads. Click 'Syncthing Windows Setup' under the Integrations heading (there are also versions of Syncthing for macOS and Linux).

On the page this loads, scroll down to Download and click the link that starts with 'github.com…'. This takes you to the list of releases – this may have been updated since we wrote this feature, when the latest version was 2.0.0 (**1** in our screenshot). Click 'syncthing-windows-setup.exe' **2** to download the installer to your computer.

Launch it and if Windows shows a SmartScreen warning, click the 'More info' link followed by 'Run anyway'. Click through the installation instructions (we clicked Next on every screen without making any changes). However, when you reach the screen called Select Configuration Settings, it's worth casting an eye over its contents.

While we wouldn't recommend making any changes here, understanding what you're looking at can help you to grasp how it works later. The 'Automatic upgrade interval' (1 in our screenshot below) is the number of hours after which Syncthing will check the server for a new version of the software. If it finds one, it will install it – unless you have set this to zero ('0'). If you've done that, it will still check for updates, but it won't automatically apply them. Instead, it will display an alert on the Syncthing dashboard (which we'll explain in a moment) telling you that there's an upgrade to apply if you want it.

The 'GUI configuration page listen address' 2 is the first part of the address that you'll type into your browser to access Syncthing's dashboard. The default (which you shouldn't change) is 127.0.0.1. This is an industry standard address that loops back the web request to the web server running inside your own machine rather than sending it out to the internet.

The 'GUI configuration page listen port' on the line below (8384) 3 more specifically targets a particular function running on your own machine – in this case, Syncthing.

To better understand what we're talking about, imagine your computer is a large building containing 10,000 offices. The building's street address is 127.0.0.1, and the office where you'll find the service with whom you want to do business is number 8384. If we were writing it on an envelope, we might address our mail to Suite 8384, 127001 High Street.

HOW I USE SYNCTHING

I've been using Syncthing for several months to share files between Windows computers, PCs running Linux, a Mac and a Raspberry Pi. I initially set it up on the Raspberry Pi using an operating system called DietPi, but it's really no more difficult to do it on Windows, as you'll see here. Having a shared folder on all of my devices has greatly simplified my working life..

Nik Rawlinson

> "Syncthing runs in the background on each of the machines you want to sync files between. It then watches out for changes on other computers in the network and — when it spots them — updates its own folders to match."

But, when typing it into a browser we can be more succinct and instead use the address 127.0.0.1:8384. If we type that once we've finished setting things up, we'll arrive at the Syncthing dashboard.

Finally, 'Relays enabled' is set to 'true' 4. This lets the tool use other Syncthing servers to transmit data between your devices if they can't see each other on your local network. Leaving this enabled (as is the default) makes Syncthing behave in a similar way to a traditional cloud-synchronisation service. However, if you only ever want to transmit data across your local network, set this to false, then see the box on opposite page for instructions to turn off Global Discovery.

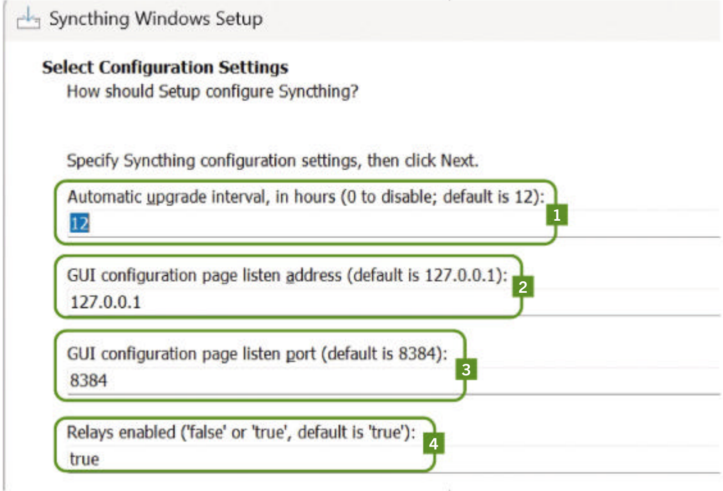
Click Next and again leave options as they are on the following screen. Specifically, check that Syncthing will start when logging on (1 below) and will start after installation 2. Click Next one final time, then Install.

Connections into and out from your computer are monitored by Windows Firewall, which will block unauthorised or unrecognised connections by default. Unless an exception is made for Syncthing, it would therefore not be able to communicate with the other computers on your network. As part of the installation process, it will ask if it should create a Windows Firewall rule for Syncthing (1 in our screenshot below). Click Yes 3 and, when Windows asks if you 'want to allow this app to make changes to your device', click Yes again.

That's the last thing you need to do. The installation routine will complete. Leave the box beside 'Open Syncthing configuration page' ticked and click Finish. Repeat this process on the other machines with which you want to synchronise your data.

2 CREATE USERNAME AND PASSWORD

The first time you launch Syncthing, your browser may warn you that the connection is insecure. If you were connecting to a remote server this might be more of a worry, but here you're simply



Syncthing Windows Setup

Select Configuration Settings

How should Setup configure Syncthing?

Specify Syncthing configuration settings, then click Next.

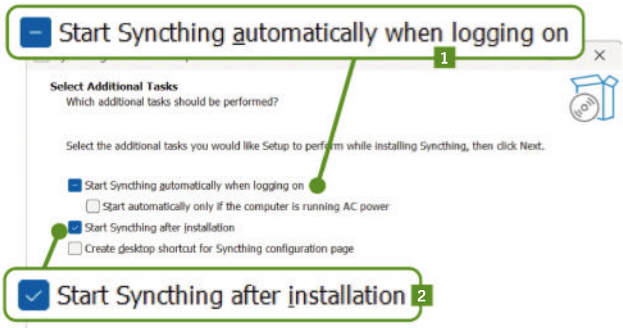
Automatic upgrade interval, in hours (0 to disable; default is 12): 12

GUI configuration page listen address (default is 127.0.0.1): 127.0.0.1

GUI configuration page listen port (default is 8384): 8384

Relays enabled ('false' or 'true', default is 'true'): true

LEFT: Familiarise yourself with the dashboard's web address and port.



Select Additional Tasks

Which additional tasks should be performed?

Select the additional tasks you would like Setup to perform while installing Syncthing, then click Next.

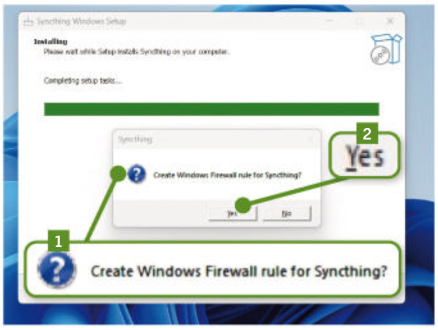
☑ Start Syncthing automatically when logging on

☐ Start automatically only if the computer is running AC power

☑ Start Syncthing after installation

☐ Create desktop shortcut for Syncthing configuration page

Start Syncthing automatically when logging on
1
Start Syncthing after installation
2



Syncthing Windows Setup

Installing

Please wait while Setup installs Syncthing on your computer.

Completing setup tasks...

Create Windows Firewall rule for Syncthing?

Syncthing
Yes
No
1
Create Windows Firewall rule for Syncthing?
2
Yes

Click 'Yes' on this installation screen so Windows Firewall doesn't block Syncthing.

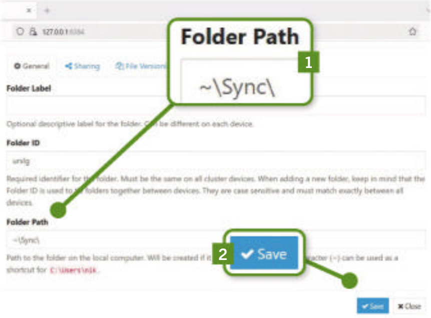
accessing files on your own machine. So, if you see the warning, click the option to continue.

Syncthing will ask if you're happy to allow anonymous usage reporting, which tells it how you use the software but without revealing your identity. Click Yes or No, depending on your preference.

Next, look at the green info box at the top of the screen warning that you've not set up a username and password for the GUI. The GUI is the Graphical User Interface, which you're looking at now. It's through this that you can control which machines are part of your synced network, so you really should protect it.

Click Settings, then switch to the GUI tab and enter a username in the GUI Authentication User box (1 in our screenshot below), and a password in the GUI Authentication Password box 2. Click Save and you'll be logged out. Now use the credentials you just set to log back in.

You now need to specify which folder should be synchronised. Click '+ Add Folder', then click in the Folder Path box and type ~\Sync\ (1 in our screenshot above right). The tilde (~) is a shortcut to your user folder, and although the Sync folder you've just specified doesn't yet exist, Syncthing will create it. Click Save 2.



Folder Label

Optional descriptive label for the folder. Can be different on each device.

Folder ID

urxlg

Required identifier for the folder. Must be the same on all cluster devices. When adding a new folder, keep in mind that the Folder ID is used to tie folders together between devices. They are case sensitive and must match exactly between all devices.

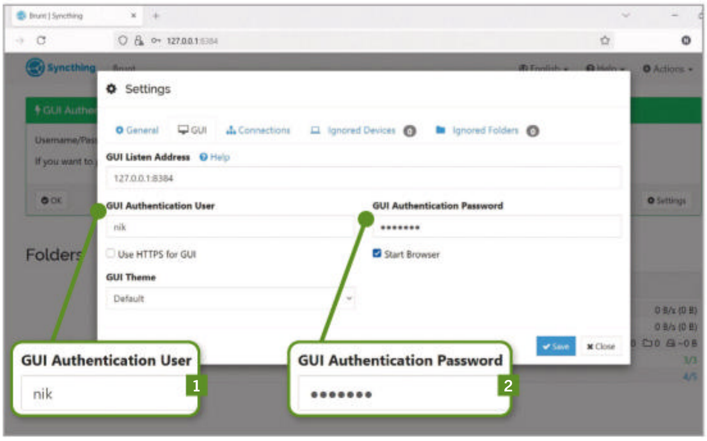
Folder Path

~\Sync\

Path to the folder on the local computer. Will be created if it does not exist. The tilde character (~) can be used as a shortcut for C:\Users\nik.

127.0.0.1:8384
General
Sharing
File Versioning
Folder Path
~\Sync\
1
2
Save
Save
Close

Syncthing will create your synchronised folder if it doesn't already exist.



Settings

GUI Listen Address: 127.0.0.1:8384

GUI Authentication User: nik

GUI Authentication Password: •••••••

☐ Use HTTPS for GUI

☑ Start Browser

GUI Theme: Default

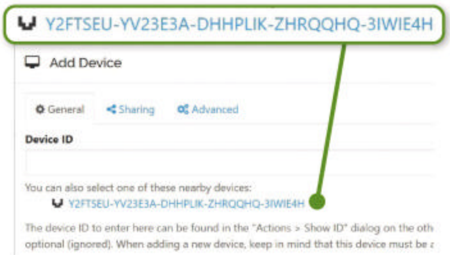
Brunt | Syncthing
127.0.0.1:8384
Syncthing
General
GUI
Connections
Ignored Devices
Ignored Folders
Help
Folders
Save
Close
GUI Authentication User
nik
1
GUI Authentication Password
•••••••
2

Set a username and password to protect the Syncthing dashboard.

3 ADD MORE COMPUTERS

If you've installed Syncthing on multiple computers, click '+ Add Remote Device'. Syncthing will look for other machines running the same software on your local network and – if it finds one – will display a long serial number made of letters and numbers (see screenshot below).

If there are several of these, that's because there's more than one other machine running on your network. If you're confused, load the same web page on your other machines (127.0.0.1:8384) and check in the This Device box (top right of the dashboard). There, you'll see seven blue letters and numbers to the right of the 'Identification' heading. Match this up with the first seven digits of the codes shown on the machine you were originally using so you know which one is which.



Y2FTSEU-YV23E3A-DHHPLIK-ZHRQQHQ-3IWIE4H

Add Device

Device ID

You can also select one of these nearby devices:

Y2FTSEU-YV23E3A-DHHPLIK-ZHRQQHQ-3IWIE4H

The device ID to enter here can be found in the "Actions > Show ID" dialog on the oth

optional (ignored). When adding a new device, keep in mind that this device must be a

General
Sharing
Advanced

The blue serial number represents another PC running Syncthing on our network.

Click the serial number of the machine you want to add, and (optionally) give it a recognisable name, like 'Lenovo laptop'. Switch to the second machine and you'll see an alert at the top of the Syncthing page asking you to authorise the connection (1 in our screenshot above). Click '+ Add Device' 2 and the two machines will be allowed to share their data.

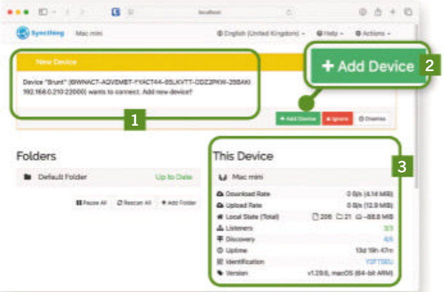
You'll now see the machine you just connected to in the Remote Devices panel on the right-hand side of the Syncthing dashboard 3 on each computer.

Finally, you need to share the synchronised folder on your first machine with the second. To do this, click the grey box below Folders on the left-hand side of the Syncthing dashboard, then click Edit. Switch to the Sharing tab and click in the box beside the name of the machine you just added, then click Save.

Now, any files you save (or copy) to the Sync folder inside your user folder on this machine will automatically appear in the synchronised folder of every other connected machine on your synchronised network. ■

MAKE SURE DATA IS ONLY SENT LOCALLY

We mentioned that there was a way to make sure your data only ever travelled on your local network. If you set 'Relays enabled' to 'false' when initially setting up Syncthing, you're halfway there. The other change you need to make is to turn off Global Discovery. To do this, click Actions in the top right of the Syncthing dashboard, then click Settings. Switch to the Connections tab and untick 'Global Discovery'. Click Save.



New Device

Device "Brunt" (BWNACT-AQVEMBT-YXACT44-6SLKVTT-ODZ2PKW-258AKI 192.168.0.210:22000) wants to connect. Add new device?

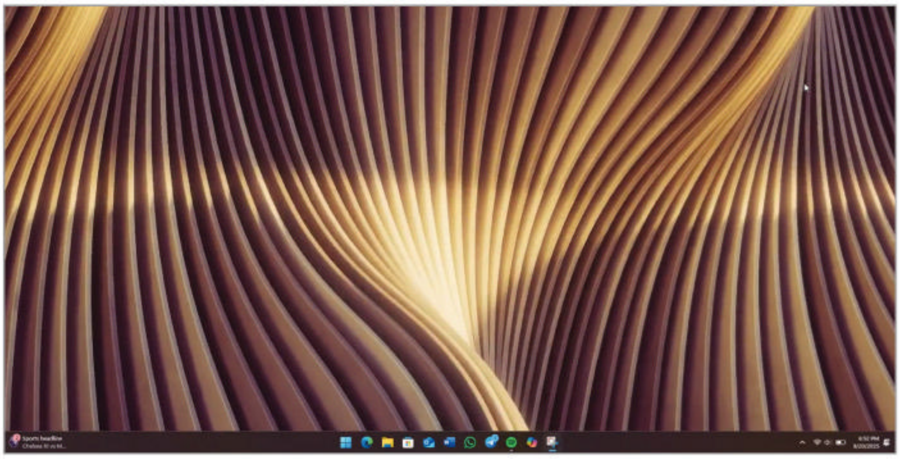
Syncthing
Mac mini
English (United Kingdom)
Help
Actions
+ Add Device
2
+ Add Device
Ignore
Dismiss
1
Folders
Default Folder
Up to Date
Pause All
Rescan All
Add Folder
This Device
3
Mac mini
Download Rate
Upload Rate
Local State (Total)
Listeners
Discovery
Uptime
Identification
Version

Click '+Add Device' and your two computers will be able to share your data.

What's the fuss about...

Video wallpapers

Microsoft is reviving a desktop tool last seen in Windows Vista.



"Insiders are already making their own wallpapers. Our favourite is the sea of swirling gold pictured above from Zac Bowden"

What are they?

Animations and videos you can set as desktop wallpapers, giving you something more interesting to look at than a static image. They might be making a comeback in Windows.

When were they last available?

Back in Windows Vista, which launched in January 2007, but was superseded by Windows 7 less than three years later. The feature was called DreamScene.

Really? I don't remember it in Vista.

That's probably because you didn't pay for any Ultimate Extras in the operating system. This was Microsoft's short-lived scheme to sell bonus features – as well as DreamScene you got BitLocker (now in Windows 11 Pro), sound effects for pop-ups and alerts, and the games *Hold 'Em* poker and *Microsoft Tinker*.

Microsoft Tinker?

Yes, Tinker was a robot you had to guide through 60 levels of mazes and obstacles. But let's get back to DreamScene, which let you play MPEG and WMV videos as desktop backgrounds.

What did they look like?

Well, that depended on the files you turned into desktop videos. You'll get an idea from this YouTube video, uploaded back in 2008 (**tinyurl.com/APC553dream**), showing swirling clouds, stomach-churning rollercoasters, beautiful coral reefs and much more. It looks great, and reminds us of the potential DreamScene had.

Why was it dropped after Vista?

Because it never proved popular. Many people found video desktops simply too distracting, and they used too many resources, making PCs sluggish. And it wasn't free, remember – Vista's Ultimate Extras cost over $230. That's a lot to pay even for a feature that speeds up your PC, let alone one that actually slows it down.

Then why is Microsoft bringing it back?

It thinks computers are now powerful enough to play video wallpaper without wheezing to a halt. And also because there's a growing demand from users. You can play video wallpapers on several Linux distros, including KDE Plasma (**https://kde.org**), while macOS lets you set a video background as your lock screen. You can add video wallpaper to Windows using third-party programs, such as Lively Wallpaper (**tinyurl.com/APC553lively**) and Wallpaper Engine (**www.wallpaperengine.io/en**), but Microsoft would rather you didn't have to. Indeed, it considered introducing them in 2023, as leaked by former employee Sergey Kisselev (see **tinyurl.com/APC553serg**).

So are they available now?

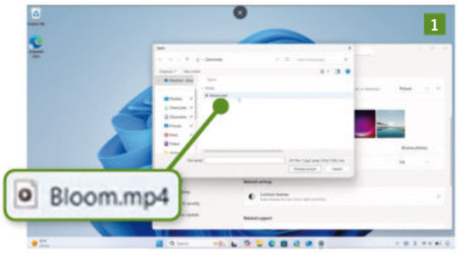
Not to everyone. It's a hidden feature available only to Windows Insiders, first spotted on X by a user by the name of @phantomofearth. He posted a video of selecting Windows 11's 'bloom' wallpaper as an MP4 (see screenshot 1) and then showed it rising from the bottom of the desktop as video wallpaper 2 – watch at **tinyurl.com/APC553bloom**.

But can you add your own videos?

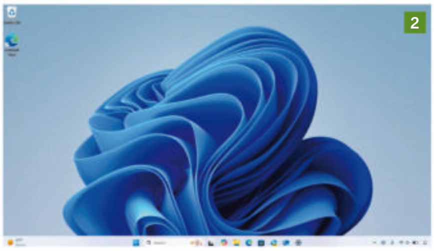
Yes, even Microsoft realises users want more interesting videos than a blue flower 'blooming' across your screen. It's extremely versatile, supporting many more formats than DreamScene did: AVI, MKV and MOV as well as MP4.

Will it arrive in the full version of Windows eventually?

We reckon so. The demand is there, and modern PCs should be able to play them without grinding to a halt. Insiders are already making their own wallpapers. Our favourite is the sea of swirling gold pictured above from Zac Bowden, who writes for our sister site Windows Central (**tinyurl.com/APC553swirl**). As desktops go, it beats our blurry holiday photos. ■



You can save wallpaper files as an MP4, among other formats…



…and it'll then appear as a video on your desktop.

Block ads and fingerprint tracking

NEW IN apc

Ads are annoying, but they can be blocked.

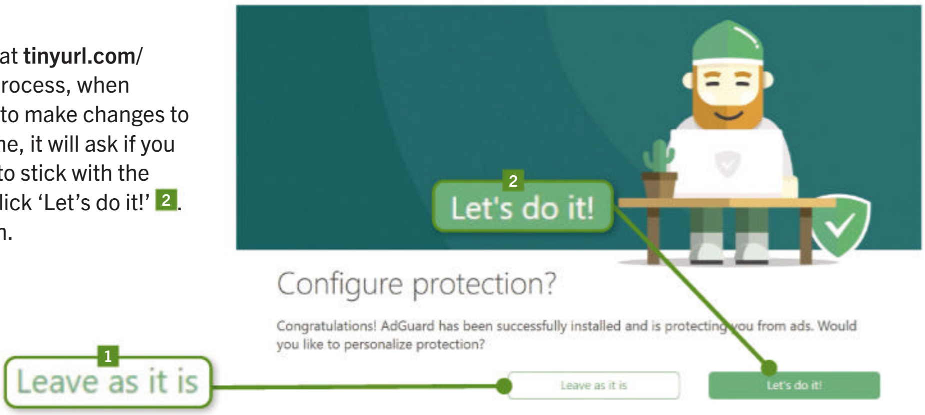
IT WILL TAKE
30 minutes

YOU'LL NEED
AdGuard

AdGuard, which is available to download to your PC to prevent ads within programs and as a browser extension to remove them online, has just been updated. Alongside its built-in filters, it lets you apply additional block lists for other online annoyances, such as pop-ups and even dubious websites. And you don't need to create these yourself. As we'll explain here, you can simply download filters that users of AdGuard and other tools have compiled and shared for anyone to use. We'll also point you towards a great new feature from Windscribe VPN, which reduces websites' ability to track you online.

Step 1

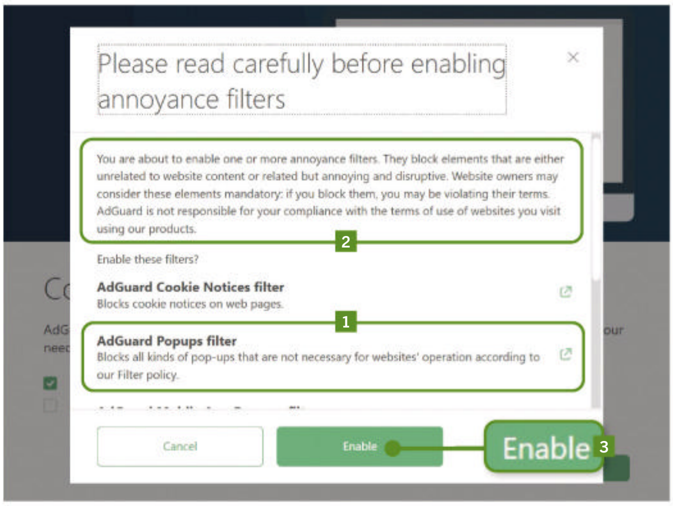
Download AdGuard from the Microsoft Store at **tinyurl.com/APC553adguard**. As part of the installation process, when prompted you need to grant permission for it to make changes to your system. When it launches for the first time, it will ask if you want to configure protection. If you're happy to stick with the defaults, click 'Leave as it is' 1. Otherwise, click 'Let's do it!' 2. Steps 2-4 apply if you choose the latter option.



Configure protection?

Congratulations! AdGuard has been successfully installed and is protecting you from ads. Would you like to personalize protection?

"Alongside its built-in filters, it lets you apply additional block lists for other online annoyances, such as pop-ups and even dubious websites. And you don't need to create these yourself."



Please read carefully before enabling annoyance filters

You are about to enable one or more annoyance filters. They block elements that are either unrelated to website content or related but annoying and disruptive. Website owners may consider these elements mandatory: if you block them, you may be violating their terms. AdGuard is not responsible for your compliance with the terms of use of websites you visit using our products.

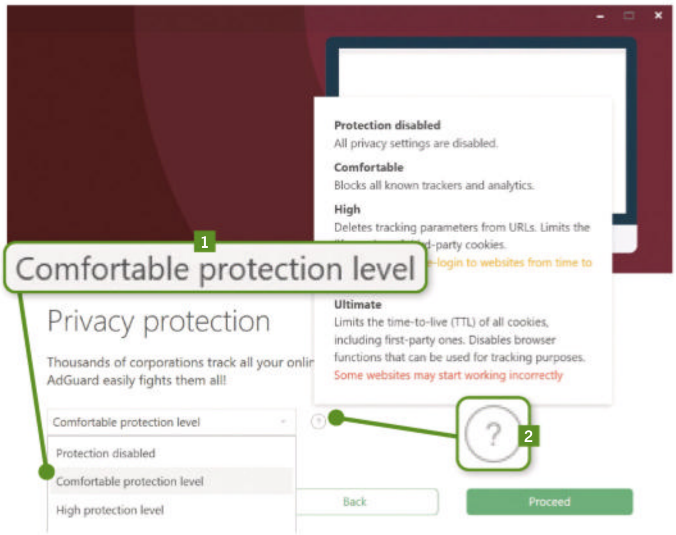
Enable these filters?

AdGuard Cookie Notices filter
Blocks cookie notices on web pages.

AdGuard Popups filter
Blocks all kinds of pop-ups that are not necessary for websites' operation according to our Filter policy.

Step 2

The AdGuard setup process provides options to block search ads, self-promotion ads and so on. On each page, tick the box beside each option you want to enable. On the third screen you'll see options to block online assistants, such as subscription pop-ups 1. These pop-ups are prevented by an 'annoyance filter' and AdGuard warns you that blocking them may violate a website's terms 2. If you turn this on, you'll need to confirm that AdGuard is not responsible for your compliance with a site's terms by clicking Enable 3 on the options that appear.



Protection disabled
All privacy settings are disabled.

Comfortable
Blocks all known trackers and analytics.

High
Deletes tracking parameters from URLs. Limits the d-party cookies. e-login to websites from time to

Ultimate
Limits the time-to-live (TTL) of all cookies, including first-party ones. Disables browser functions that can be used for tracking purposes. Some websites may start working incorrectly

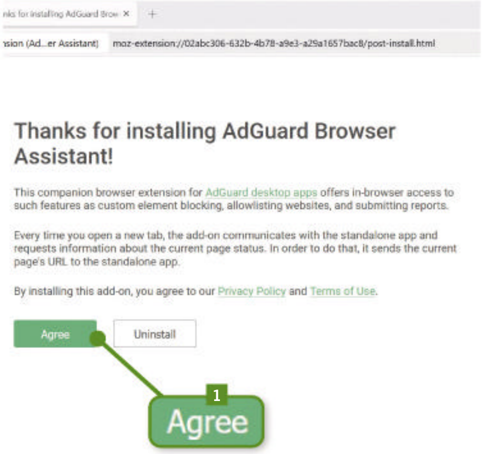
Privacy protection

Thousands of corporations track all your onlin AdGuard easily fights them all!

Comfortable protection level

Step 3

Click Proceed, then select a 'Privacy protection' level in the dropdown menu 1. If you need guidance, hover over the question mark 2 for a description of what each one does. 'Comfortable protection level' is the default, so leave this selected if you're not sure – you can change it later if necessary. Click Proceed, then decide whether you want access to fraudulent and infected websites restricted and to be notified about requests. Both of these are switched on by default and we'd recommend this setting.



nks for installing AdGuard Brow ×
+
sion (Ad...er Assistant)
moz-extension://02abc306-632b-4b78-a9e3-a29a1657bac8/post-install.html
Agree
Uninstall
1
Agree

Thanks for installing AdGuard Browser Assistant!

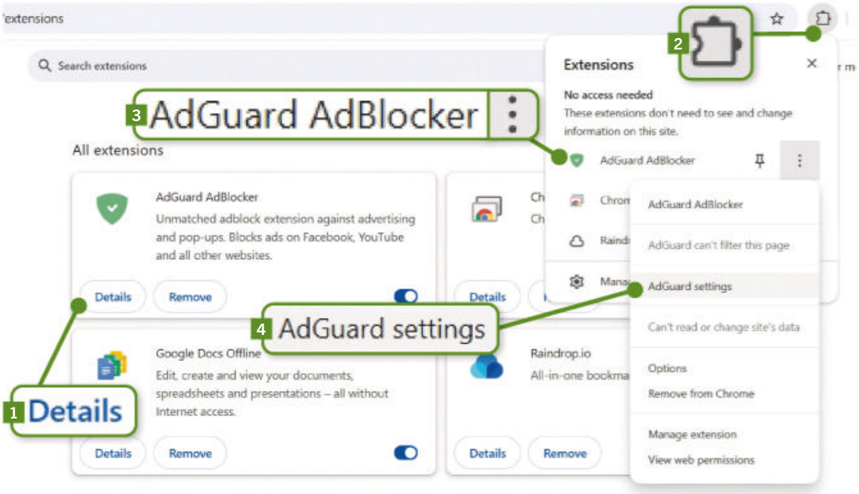
This companion browser extension for AdGuard desktop apps offers in-browser access to such features as custom element blocking, allowlisting websites, and submitting reports.

Every time you open a new tab, the add-on communicates with the standalone app and requests information about the current page status. In order to do that, it sends the current page's URL to the standalone app.

By installing this add-on, you agree to our Privacy Policy and Terms of Use.

Step 4

You can now add the AdGuard extension to your browser so you can manage filtering while browsing. Click 'Download the extension' and it will take you to the download page for your default browser. Install the extension, after which you'll need to agree to the privacy policy and terms of use – click Agree 1. Return to the AdGuard program and click through the final two screens of the process to complete the setup.



'extensions
Search extensions
3 AdGuard AdBlocker
2
All extensions
Details
Remove
Ch
Ch
Details
4 AdGuard settings
Google Docs Offline
Raindrop.io
All-in-one bookma
1 Details
Details
Remove
Details
Remove
Extensions
No access needed
AdGuard AdBlocker
Chron
Raindi
Mana
AdGuard AdBlocker
AdGuard can't filter this page
AdGuard settings
Can't read or change site's data
Options
Remove from Chrome
Manage extension
View web permissions

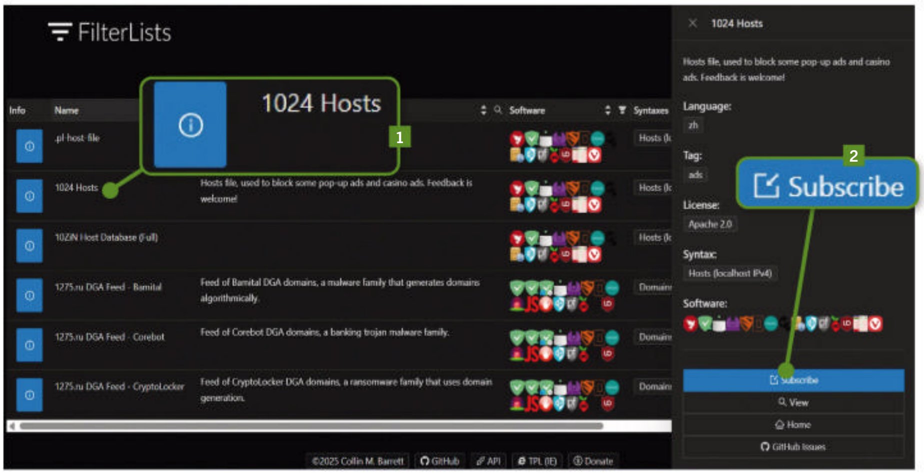
AdGuard AdBlocker
Unmatched adblock extension against advertising and pop-ups. Blocks ads on Facebook, YouTube and all other websites.

Google Docs Offline
Edit, create and view your documents, spreadsheets and presentations – all without Internet access.

These extensions don't need to see and change information on this site.

Step 5

AdGuard lets you import rules you can use in addition to its default filters. These rules consist of addresses that, if matched, will be blocked so their content doesn't appear on your PC. Type **chrome://extensions/** in your browser's address bar, and click Details 1 in the AdGuard AdBlocker box. Scroll down to 'Allow user scripts' and click the slider so it slides to the right. Now click the extensions icon at the top 2, followed by the three dots to the right of AdGuard AdBlocker 3, then 'AdGuard settings' 4.



FilterLists
1024 Hosts
1
2
Subscribe
Info
Name
Software
Syntaxes
Hosts (lc
Domains
Language:
zh
Tag:
ads
License:
Apache 2.0
Syntax:
Hosts (localhost IPv4)
Software:
Subscribe
View
Home
GitHub Issues
©2025 Collin M. Barrett
GitHub
API
TPL (IE)
Donate

Name	
.pl host file	
1024 Hosts	Hosts file, used to block some pop-up ads and casino ads. Feedback is welcome!
1024N Host Database (Full)	
1275.ru DGA Feed - Bamital	Feed of Bamital DGA domains, a malware family that generates domains algorithmically.
1275.ru DGA Feed - Corebot	Feed of Corebot DGA domains, a banking trojan malware family.
1275.ru DGA Feed - CryptoLocker	Feed of CryptoLocker DGA domains, a ransomware family that uses domain generation.

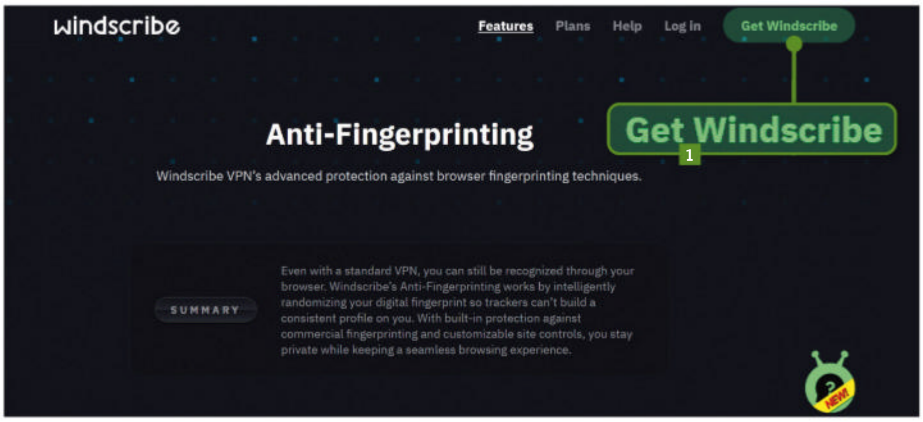
1024 Hosts
Hosts file, used to block some pop-up ads and casino ads. Feedback is welcome!

Step 6

You can find pre-compiled lists of resources you may want to block at sites like **www.filterlists.com**. We're going to use '1024 Hosts' from the site's first screen for our tests – it blocks some pop-up ads and casino sites. Click the blue button to the left of one that you want to use 1, then click Subscribe 2. An AdGuard message box will appear, offering to add the filter. Click Next, then tick the box beside Trusted and click Add. To delete the list later, click the red bin icon next to its name on the AdGuard page that opens once you've enabled it.

Step 7

Finally, Windscribe VPN allows you to send up to 10GB of your data through its servers for free if you install its software and set up an account. It has recently introduced an anti-fingerprinting feature that obscures information such as lists of installed fonts, screen resolution and more. Some websites use this info instead of cookies to track you as you move around the web. Obscuring them can help protect your privacy. If you want to try it out, click Get Windscribe 1 at **www.windscribe.com** to get started. ■



windscribe
Features
Plans
Help
Log In
Get Windscribe
Get Windscribe
1
SUMMARY
NEW!

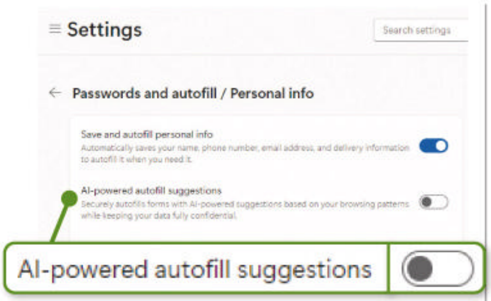
Anti-Fingerprinting

Windscribe VPN's advanced protection against browser fingerprinting techniques.

Even with a standard VPN, you can still be recognized through your browser. Windscribe's Anti-Fingerprinting works by intelligently randomizing your digital fingerprint so trackers can't build a consistent profile on you. With built-in protection against commercial fingerprinting and customizable site controls, you stay private while keeping a seamless browsing experience.

Browser tips

Secret settings and best extensions.



Passwords and autofill / Personal info

Save and autofill personal info
Automatically saves your name, phone number, email address, and delivery information to autofill it when you need it.

AI-powered autofill suggestions
Securely autofills forms with AI-powered suggestions based on your browsing patterns while keeping your data fully confidential.

AI-powered autofill suggestions

EDGE

Stop Edge using AI to auto-fill online forms

The auto-fill feature in browsers saves you having to type your name, email address and other personal details every time you fill in an online form. Edge 140 (released in August) introduces an additional auto-fill option, which “autofills forms with AI-powered suggestions based on your browsing patterns”.

Although Microsoft claims it keeps your data “fully confidential”, you may not feel comfortable with AI analysing your browsing activity. The new option should be disabled by default, but it’s worth double-checking to stop unwanted entries appearing in forms.

To do so, click Edge’s three-dot menu button and choose Settings, then ‘Passwords and autofill’. Select ‘Personal info’ and switch off ‘AI-powered autofill suggestions’ (see screenshot above).

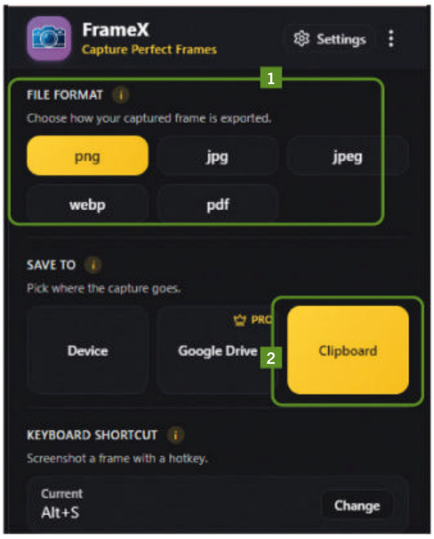
CHROMIUM

Capture screenshots of online videos

The new extension FrameX (**tinyurl.com/APC553shot**) offers an easy way to capture screenshots of online videos. It works on sites including YouTube, Facebook and Instagram, and even on streaming services that show a black screen when you try to take a screenshot.

To use FrameX, simply click the camera button it adds to a video player’s controls or to the top-right corner of a video. Alternatively, press the keyboard shortcut Alt+S. If you see a notification asking for permission to download files, click Allow.

By default, screenshots are downloaded to your PC in PNG format. Click the extension’s toolbar button to save them in another format (1 in our screenshot left) or to copy grabs to your clipboard instead 2.



FILE FORMAT
Choose how your captured frame is exported.

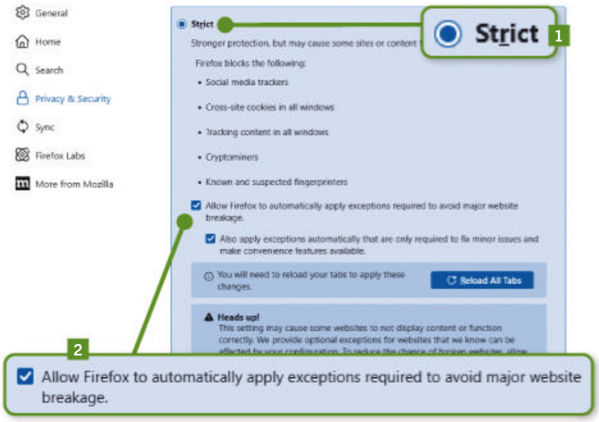
SAVE TO
Pick where the capture goes.

KEYBOARD SHORTCUT
Screenshot a frame with a hotkey.

Current
Alt+S

Chromium

Block trackers without breaking sites



○ Strict
Stronger protection, but may cause some sites or content
Firefox blocks the following:
- Social media trackers
- Cross-site cookies in all windows
- Tracking content in all windows
- Cryptominers
- Known and suspected fingerprinters

☑ Allow Firefox to automatically apply exceptions required to avoid major website breakage.

☑ Also apply exceptions automatically that are only required to fix minor issues and make convenience features available.

You will need to reload your tabs to apply these changes.

Heads up!
This setting may cause some websites to not display content or function correctly. We provide optional exceptions for websites that we know can be affected by your configuration. To reduce the chance of broken websites, allow

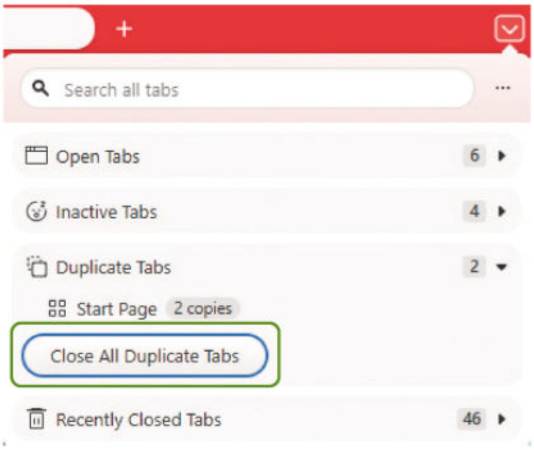
The Enhanced Tracking Protection feature in Firefox blocks many trackers as you browse the web to stop them following you from site to site. Its Strict mode is particularly effective because it blocks trackers in standard browsing mode as well as private windows, and also blocks known and suspected fingerprinters.

The catch is that it can “cause some websites to not display content or function correctly”. Firefox 142, released in August, fixes this problem by preventing website features from being broken by its Strict mode.

To enable the option, click the browser’s three-line menu button and choose Settings, then ‘Privacy & Security’. In the Enhanced Tracking Protection section, select Strict (1 in our screenshot) and tick the box next to ‘Allow Firefox to automatically apply exceptions required to avoid major website breakage’ 2.

You can also tick the box next to ‘Also apply exceptions automatically that are only required to fix minor issues…’, but this isn’t as important.

Now click ‘Reload All Tabs’ to apply the changes.



VIVALDI

Manage multiple tabs more easily

Vivaldi is testing a new Tabs button that makes it easier to manage lots of tabs. It displays a full list of your open tabs; lets you search their titles; and lists recently closed tabs so you can reopen them with a single click.

Particularly useful is the ability to view and close inactive tabs to stop them hogging memory in the background. The Tabs button also identifies duplicate tabs, so you can close unnecessary copies (see screenshot above). The feature is currently available only in the latest Snapshot (preview) version of Vivaldi (**tinyurl.com/APC553tabs**), but should come to the stable browser in due course. ■

AI tips

Expert tips for a better experience.

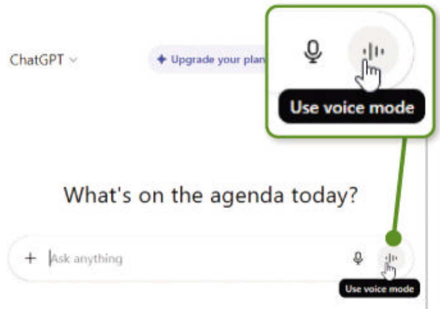
CHATGPT

Have more natural voice conversations

OpenAI has replaced ChatGPT's Standard and Advanced Voice Modes with ChatGPT Voice. This lets you engage in even more natural conversations with the chatbot, like you're talking to a real person.

ChatGPT Voice offers more emotional nuance, realistic pauses and emphasis, and a choice of nine voice characters, such as 'Easygoing and versatile'. These differ from the personality types you may have experienced, which are limited to text chats. As before, to switch to voice mode, click or tap the 'Use voice mode' button in the search box (see screenshot below).

Previously, on ChatGPT's free plan you could chat with Advanced Voice Mode for 15 minutes per day, after which you were downgraded to Standard Voice. With ChatGPT Voice, once the 15 free minutes are up you won't be able to use it again until the next day.



Gemini

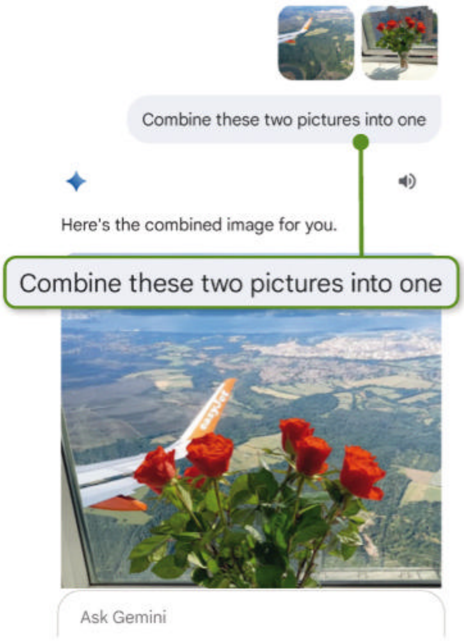
Blend multiple photos into one image

Google has significantly improved Gemini's image-editing capabilities using its new 2.5 Flash Image model (codenamed Nano Banana). Most notably, it can now blend multiple photos into one picture.

Upload two or more images, ask Gemini to combine them (see screenshot) and it will produce a new picture that blends the main elements of each – such as by placing the subject of one image on the background of another.

You can then download or share the result – note that Gemini applies a watermark to show content is AI-generated. The new feature also lets you apply the visual style of one image to an object in another.

Additionally, Gemini now keeps the subjects of pictures consistent when you try different edits. Previously, if you asked it to place a person on a new background, change their outfit or try other scenarios, their face would slightly change in the result. The new model ensures people look "consistently like themselves" in every image you create.



Combine these two pictures into one

Here's the combined image for you.

Combine these two pictures into one

DUCK.AI

Chat privately using GPT-5 mini

DuckDuckGo has added a free version of the new GPT-5 large language model to its AI assistant Duck.ai (**tinyurl.com/APC553duck**). This means you can get faster and more accurate responses, while maintaining your privacy – Duck.ai doesn't require an account and anonymises your chats.

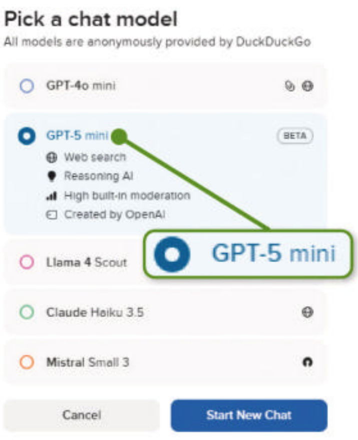
You should see the option to try GPT-5 mini (the 'mini' version is lighter and speedier) on Duck.ai's homepage. If not, click the dropdown menu in the top-left corner, pick 'GPT-5 mini' (see screenshot right) as the chat model and click Start New Chat. GPT-5 mini can't generate images or analyse files, but it's useful for private web searches and text conversations in Duck.ai.

PROTON LUMO

Get higher-quality answers

We were initially underwhelmed by Proton's new AI assistant, Lumo (**lumo.proton.me/guest**), aside from its focus on privacy – it doesn't store or train data on your chats. It's now been updated to Lumo 1.1, which makes a noticeable improvement to the quality of its answers.

You no longer need to clarify your queries to Lumo to get the information you want – it now (most of the time, at least) provides relevant responses to your initial questions without asking for further details. Its answers are also more detailed and better presented – for example, it now uses tables to organise information (see the screenshot below). ■



Pick a chat model

All models are anonymously provided by DuckDuckGo

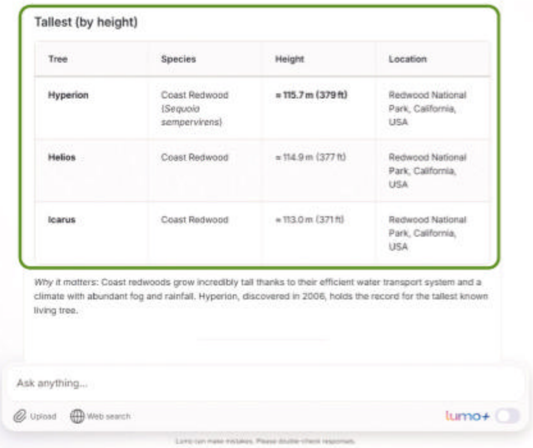
○ GPT-4o mini

● GPT-5 mini BETA
- Web search
- Reasoning AI
- High built-in moderation
- Created by OpenAI

○ Llama 4 Scout

○ Claude Haiku 3.5

○ Mistral Small 3



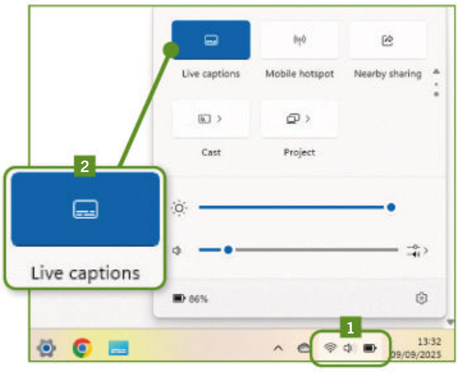
Tallest (by height)

Tree	Species	Height	Location
Hyperion	Coast Redwood (*Sequoia sempervirens*)	**≈ 115.7 m (379 ft)**	Redwood National Park, California, USA
Helios	Coast Redwood	≈ 114.9 m (377 ft)	Redwood National Park, California, USA
Icarus	Coast Redwood	≈ 113.0 m (371 ft)	Redwood National Park, California, USA

Why it matters: Coast redwoods grow incredibly tall thanks to their efficient water transport system and a climate with abundant fog and rainfall. Hyperion, discovered in 2006, holds the record for the tallest known living tree.

Make Windows better

Expert tips for a better experience.



WINDOWS 11

Turn on live captions from system tray

The keyboard shortcut Windows key+Ctrl+L turns on live captions in Windows 11, showing subtitles on screen for any spoken audio playing on your PC, whether that's a video (saved or online) or a call. There's another way to turn them on if you can't remember that shortcut or find it tricky to press. Click the 'Quick Settings' icons at the bottom right of your system tray (1 in our screenshot above) to make the box appear, then scroll down and click the 'Live captions' button so it turns blue 2. You then need to click 'Yes, continue' at the top to confirm.

WINDOWS 11

Join Wi-Fi network with a QR code

If you're using your laptop in public and trust the Wi-Fi network, you can connect to it by scanning its QR code (assuming it has one). Search for and open the Camera app then point it at the QR code. Click the notification that appears to join the network. Only QR codes that connect to Wi-Fi will work.

WINDOWS 11 INSIDER

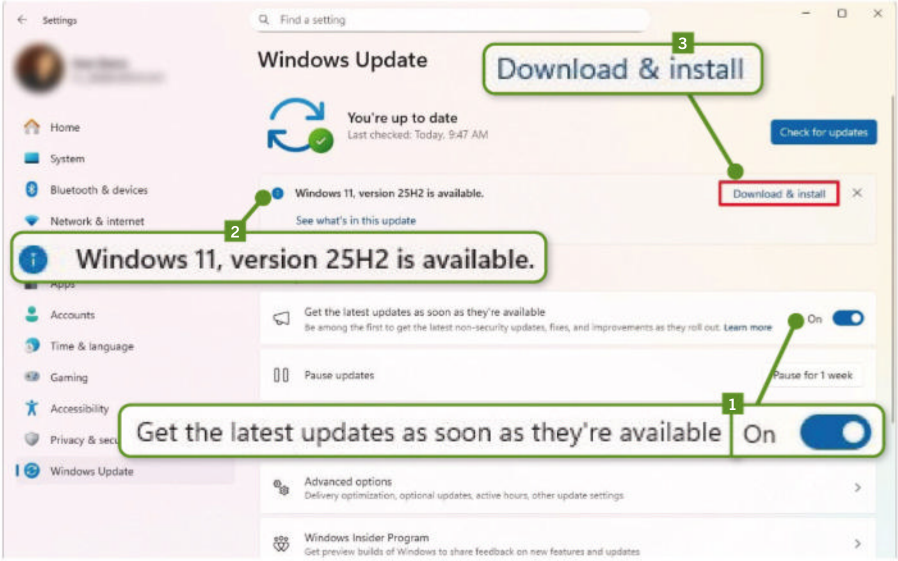
Install 25H2 feature update

Microsoft has made the final preview version of Windows 11 25H2 available for all Insiders to download. Press Windows key+I then click Windows Update on the left. Now turn on 'Get the latest updates as soon as they're available' (1 in our screenshot right) then click 'Check for updates' above. Windows will first make sure you're fully updated on 24H2.

Once that's done, you'll see 'Windows 11, version 25H2' listed 2. Click 'Download & install' 3 followed by Restart when prompted.

Note that 25H2 doesn't add any new features – it merely contains everything that's been installed so far in previous 24H2 updates.

You will still need to update to it at some point, so you might initially feel that there's no need to wait and go right ahead. However, feature updates can sometimes cause severe problems on computers, as we saw last October with the messy release of 24H2. ■



Windows Update

You're up to date
Last checked: Today, 9:47 AM

Windows 11, version 25H2 is available.
See what's in this update

Get the latest updates as soon as they're available
Be among the first to get the latest non-security updates, fixes, and improvements as they roll out. Learn more
On

Pause updates

Advanced options
Delivery optimization, optional updates, active hours, other update settings

Windows Insider Program
Get preview builds of Windows to share feedback on new features and updates

Windows 10 & 11

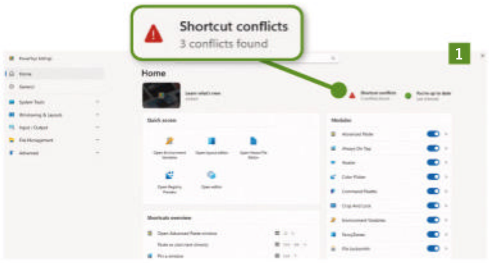
See your keyboard shortcut conflicts in PowerToys

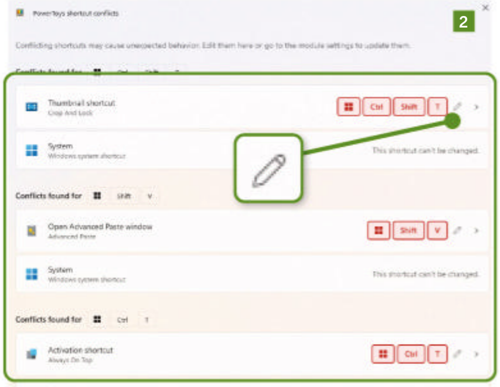
Version 0.94 of PowerToys, released in September, shows whether any of your keyboard shortcuts conflict with each other by doing two different things at once. This is a distinct possibility because PowerToys shares many of the same shortcuts as common Windows commands.

Open PowerToys and you should see a prompt to update it – if not click 'Check for updates' in the General section. Once it's been updated, click Home at the top left and PowerToys will show whether you have any conflicts (see screenshot 1). Click this warning and you'll see details of those conflicts.

In screenshot 2, for example, we have three conflicts. Most of the shortcuts for Windows can't be changed, so instead you'll have to click the pencil icon to change the shortcut used by PowerToys.

If you haven't downloaded PowerToys, visit **tinyurl.com/APC553toys** and choose your download option – it's most likely to be 'Per user – x64'.





PowerToys shortcut conflicts

Conflicting shortcuts may cause unexpected behavior. Edit them here or go to the module settings to update them.

Thumbnail shortcut
Crop And Lock

System
Windows system shortcut
This shortcut can't be changed.

Conflicts found for Shift V

Open Advanced Paste window
Advanced Paste

System
Windows system shortcut
This shortcut can't be changed.

Conflicts found for Ctrl T

Activation shortcut
Always On Top

Make Office better

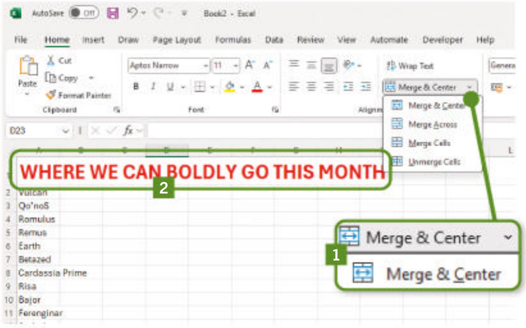
Expert tips for a better experience.

MICROSOFT WORD

Link to documents using icons

You can link to a Word document within another by adding an icon. First, save the document you want to link to. Now open a fresh document and place your cursor where you want the icon to go. Next, click Insert at the top followed by the Object dropdown menu, then Object again.

In the Object box, switch to the 'Create from File' tab then find your document on your computer and double-click it. It will appear in the 'File name' box (1 in our screenshot below). Now tick 'Display as icon' 2 and click OK. Your document will appear as a Word icon 3. Now simply click it to open it.


WHERE WE CAN BOLDLY GO THIS MONTH
2 Vulcan
3 Qo'noS
4 Romulus
5 Remus
6 Earth
7 Betazed
8 Cardassia Prime
9 Risa
10 Bajor
11 Ferenginar

Merge & Center
1
Merge & Center
2

MICROSOFT EXCEL

Create a bold heading for your spreadsheet

You can easily create a bold heading for your spreadsheet above the data in the cells. Navigate to the top of your sheet then right-click and select Insert followed by 'Entire row'.

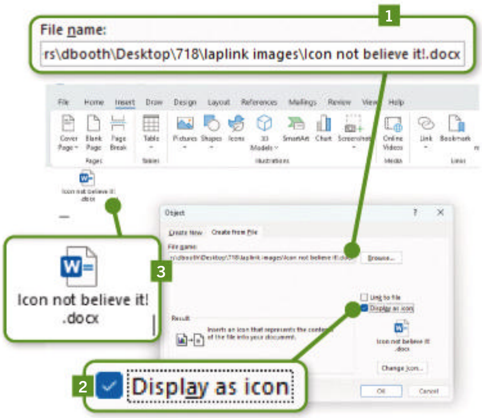
Next, select cell A1 and type your heading. Now select the range of cells to contain the spreadsheet title. Finally, click the Home tab, then the Merge & Center dropdown menu and 'Merge & Center' within that (1 in our screenshot). Your heading will be centred across your chosen cells.

To make the title stand out even more, increase the font size, use bold formatting (press Ctrl+B), and choose a distinctive colour 2.

ONLYOFFICE

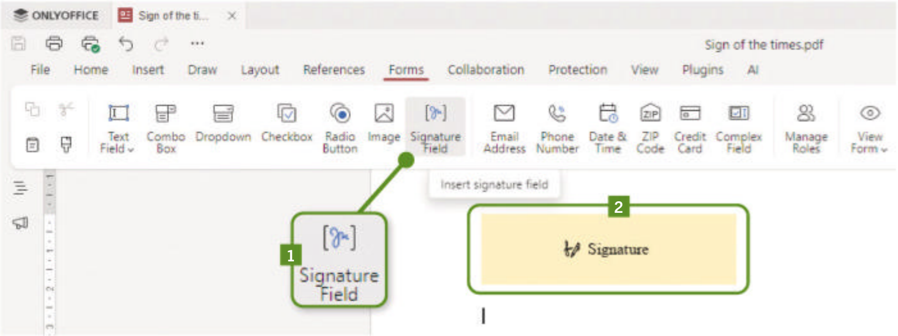
Always show signature boxes in forms

Version 9.0 of OnlyOffice, released in June, makes the signature box in forms more prominent. You'll see this by clicking Forms at the top then Signature Field (1 in our screenshot below). A pale yellow box will appear with a pen icon and the word 'Signature' 2, making it obvious where you have to sign. This will remain shown in the form. In previous versions of OnlyOffice you had to click on the form for the signature box to appear. ■


File name:
rs\dbooth\Desktop\718\laplink images\Icon not believe it!.docx

☑ Display as icon

1
Icon not believe it!
.docx
3
2


ONLYOFFICE
Sign of the times.pdf
File
Home
Insert
Draw
Layout
References
Forms
Collaboration
Protection
View
Plugins
AI
Text Field
Combo Box
Dropdown
Checkbox
Radio Button
Image
Signature Field
Email Address
Phone Number
Date & Time
ZIP Code
Credit Card
Complex Field
Manage Roles
View Form
Insert signature field
1
Signature Field
2
Signature

Libreoffice

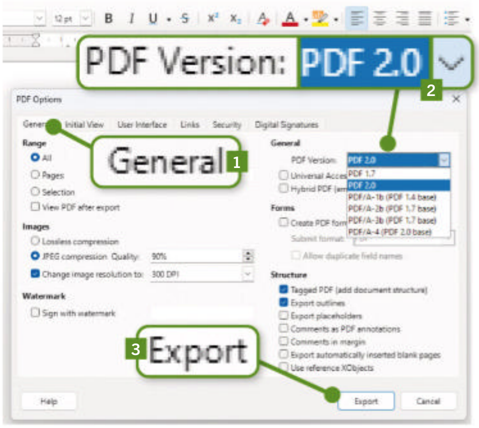
Export files in PDF 2.0 format

The new version of LibreOffice (25.8, **tinyurl.com/APC553libre**, released in August), finally adds support for PDF 2.0. This is the latest PDF standard, approved back in 2017. It uses stronger encryption, making it harder for anyone to edit your PDFs without permission. It also works more consistently across different operating systems, software and devices – so fonts, images and layouts appear as you want them to.

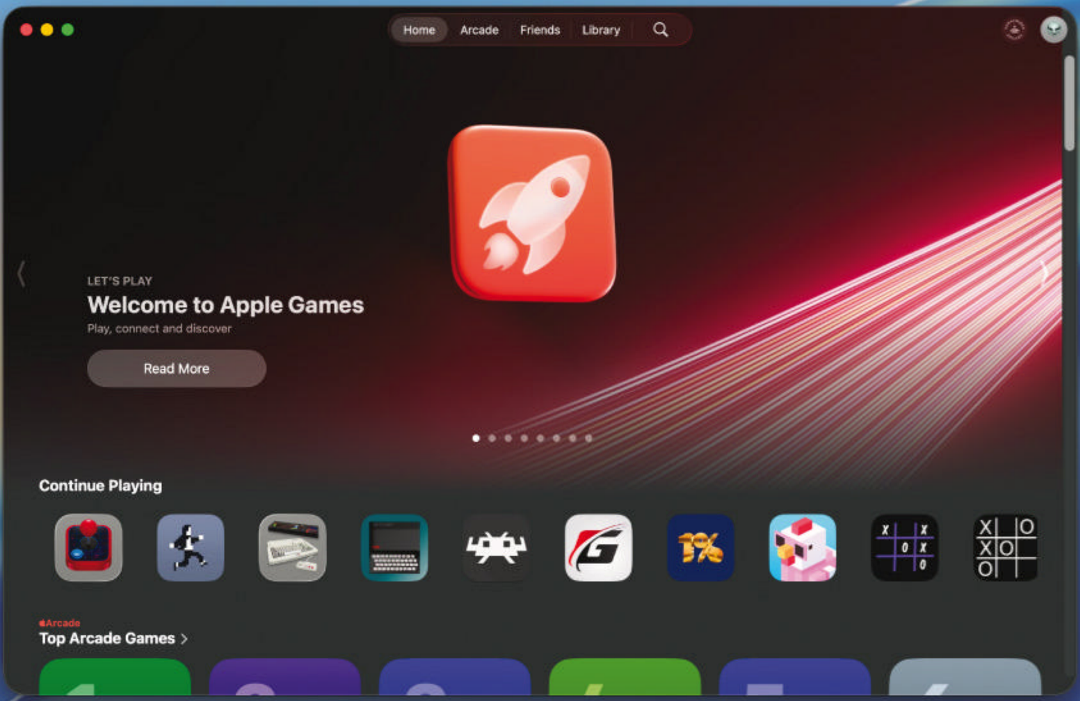
PDF 2.0 files are backwards compatible, so they can be opened in most older PDF software – though you won't benefit from the new features. These also include tags that help screen readers understand headings, emphasis and structure, as well as the ability to embed files directly inside the PDF. Plus, files stored as PDF 2.0 are likely to remain readable for longer than previous standards.

To export as PDF 2.0, click 'File' at the top left then select Export As, followed by 'Export as PDF'. Make sure the General tab is selected (1 in our screenshot) then choose PDF 2.0 in the 'PDF Version' dropdown menu 2 (the previous standard, PDF 1.7, is also an option). Make any other changes you need. Finally, click Export 3.

Note that LibreOffice 25.8 is the first version not to work on Windows 7, 8 and 8.1, nor on 32bit systems.


PDF Version: PDF 2.0

2
General
1
3
Export


Home
Arcade
Friends
Library
LET'S PLAY
Welcome to Apple Games
Play, connect and discover
Read More
Continue Playing
Arcade
Top Arcade Games

Master the new Games app

Level up your gaming experience and blast off with Apple's new games hub.

IT WILL TAKE
10 minutes

YOU WILL LEARN
How the new Apple Games app works and how to get the most out of it

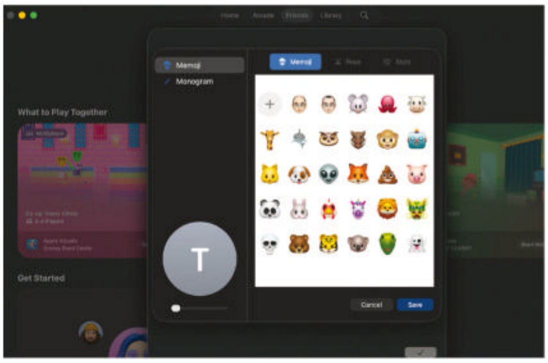
YOU'LL NEED
macOS 26 or later

Apple Games isn't playing around. The new app, available by default in macOS 26 (Tahoe), looks set to become the go-to hub for anyone who wants to get their gaming kicks and it has the potential to help revitalise gaming on the Mac. Not only does it bring together the games you've installed, it also shows you the games you've previously played on iPhone and iPad and allows you to quickly enjoy them. What's more, it will give direct access to emulators including OpenEmu.

Here, we explore the features in more depth, enabling you to get up to speed and enjoy playing your games (whether installed directly, from the App Store, Steam, GOG.com or elsewhere) with friends, engage in challenges and unlock achievements. Just be sure to sign into Game Center and the App Store using the same Apple Account first. And perhaps consider signing up to the Apple Arcade subscription service which is still a great way to enjoy an inexpensive gaming fix. ■

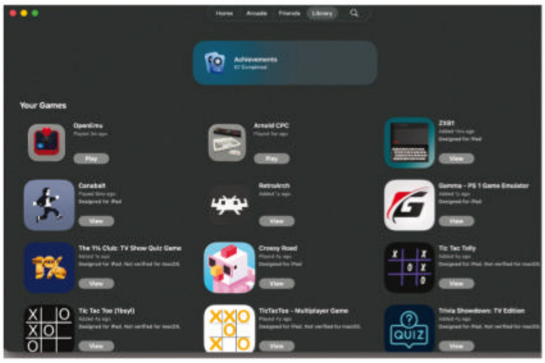
David Crookes

How to Use the Games app


What to Play Together
Memoji
Monogram
Get Started
T
Cancel
Save

1 Manage a profile

If you don't have a Game Center profile, when signing into Games, you'll be asked to choose an avatar and nickname. Both can be changed by clicking your avatar in the top-right of Games and selecting Edit Profile.

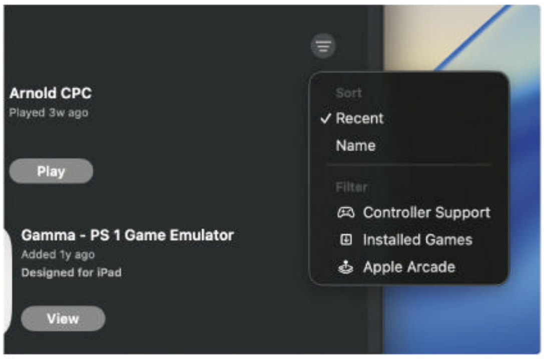

Achievements
Your Games

2 View your games

Games downloaded to your Mac, iPad or iPhone appear in the Library tab (some also appear under Continue Playing in the Home tab). If you have an Arcade subscription, you can view games under Arcade too.

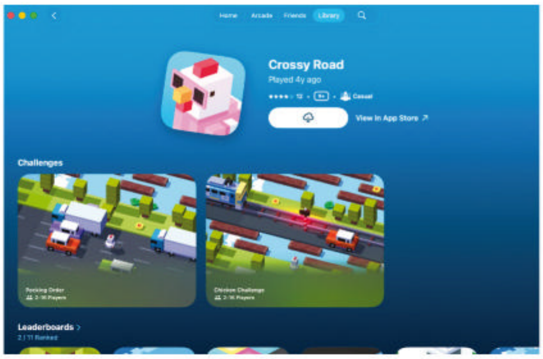
GENIUS TIP!
You can't remove installed titles via the Games app – you'll need to delete them. Launch Finder, click Applications and drag the game to the Bin.

Continued Use the Games app


Arnold CPC
Played 3w ago
Play
Gamma - PS 1 Game Emulator
Added 1y ago
Designed for iPad
View
Sort
✓ Recent
Name
Filter
Controller Support
Installed Games
Apple Arcade

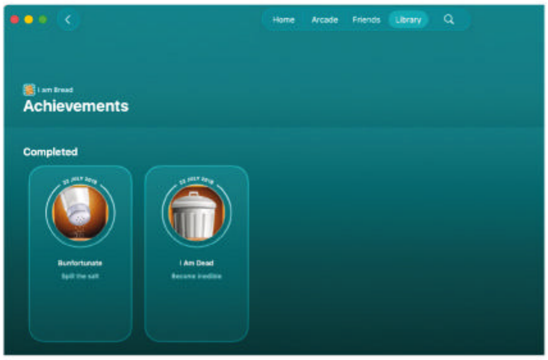
3 Find games quickly

Click the Library filter button to sort games by Recently Installed, their Name, controller support, installed titles and those available via Apple Arcade. Click Apple Arcade in the Library tab for a similar filter.


Home
Arcade
Friends
Library
Crossy Road
Played 4y ago
View in App Store ↗
Challenges
Pecking Order
Chicken Challenge
Leaderboards ›

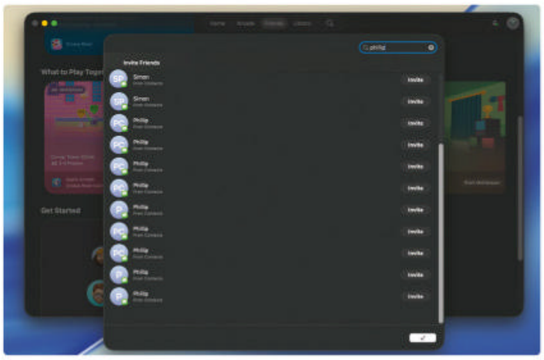
4 Play a game

Want more? Check out the Home tab for suggestions. Ready to play? For installed games, just click Play. Otherwise, select View and click the cloud or Get button to install it – even if it was designed for iPhone or iPad.


Home
Arcade
Friends
Library
I am Bread
Achievements
Completed
Bunfortunate
Spill the salt
I Am Dead
Become inedible

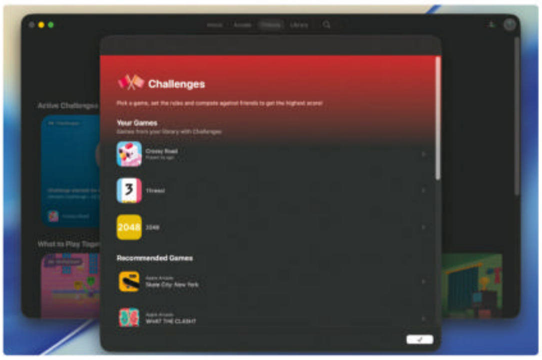
5 Track your achievements

Some games have achievements awarded for completing particular tasks. Select Library > Achievements or Profile > Achievements to check your progress. You can also click a game to see your rank on leaderboards.


Invite Friends
Simon
Philip
Invite

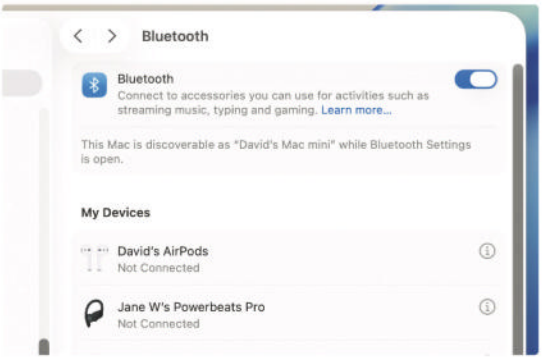
6 Add friends

Play's better shared. You can go to the System Settings app, click Game Center > Discoverability and let friends to find you. Or select the Friends tab, click the Add icon, enter their name/nickname and click Invite.


Challenges
Your Games
Crossy Road
Threes!
2048
Recommended Games
Skate City: New York
WHAT THE CLASH?

7 Challenge your pals

Invites are sent via Messages links and appear in your Profile. When connected, click Friends, browse What to Play Together and click Start. Or alternatively, click Challenges, select a game and compete for high scores or set goals.



Bluetooth
Connect to accessories you can use for activities such as streaming music, typing and gaming. Learn more...

This Mac is discoverable as "David's Mac mini" while Bluetooth Settings is open.

My Devices
David's AirPods
Not Connected
Jane W's Powerbeats Pro
Not Connected

8 Add a game controller

To connect a Bluetooth game controller, press the appropriate pairing button on the device, then go to System Settings, click Bluetooth and select the gamepad to connect. Click Game Controllers to customise buttons.

GENIUS TIP!
You will see a cloud icon if you have previously purchased a game. You can download it again for free. Otherwise, you will see the word Get.

GENIUS TIP!
If you are playing a game across devices, just make sure you're logged into the same Apple Account, allowing you to pick up where you left off.

Phone & tablet tips

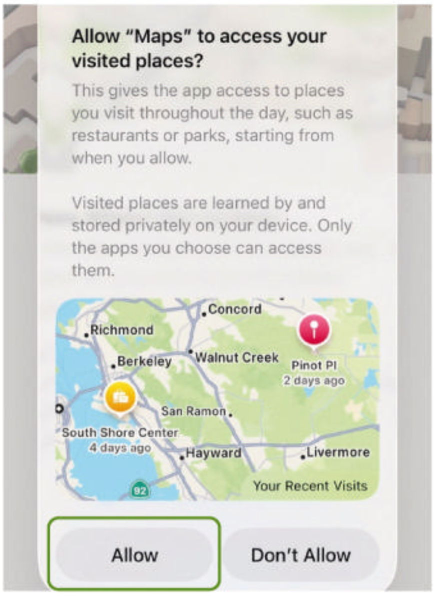
Brilliant things to do on your device.

iOS

TRY THE NEW FEATURES IN IOS 26

Apple has released the annual new versions of its operating systems for iPhones and iPads – iOS 26 and iPadOS 26. These mark a change in its naming strategy to include the year rather than the version number – the software will last users throughout most of 2026.

The update brings lots of new features to Apple's built-in apps on your device. These include a Visited Places option in Apple Maps, which remembers your favourite locations for future reference. You'll be prompted to opt in to Visited Places when you launch Maps for the first time in iOS 26 by tapping Allow (see screenshot below left).



Allow "Maps" to access your visited places?

This gives the app access to places you visit throughout the day, such as restaurants or parks, starting from when you allow.

Visited places are learned by and stored privately on your device. Only the apps you choose can access them.

The Phone app on iPhones has been redesigned to combine your recent and missed calls on a single screen, and has two handy new options. Call Screening fields incoming calls from unknown numbers, asking callers to identify themselves and explain why they're calling. Hold Assist monitors calls when you're put on hold and notifies you when someone finally answers, so you can get on with other things while you're placed in a queue.

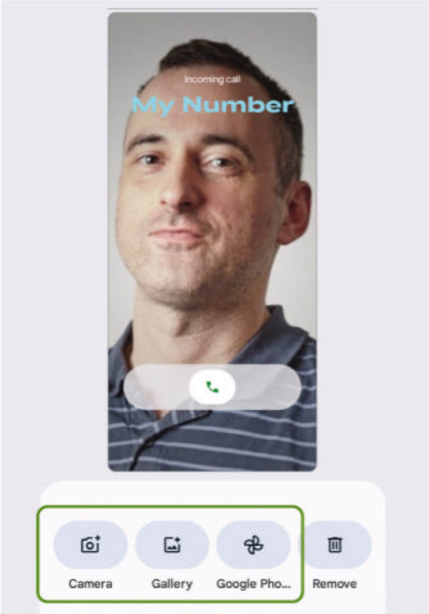
Some of the new features require Apple Intelligence, which is only supported by newer iPhones and iPads with sufficiently powerful processors. We'll look at these, and the new options available to all iOS and iPadOS 26 users, over the next few issues. If your device isn't updated automatically, open the Settings app, tap General then Software Update, and press 'Update Now'.

ANDROID

CREATE CALLING CARDS FOR YOUR CONTACTS

Google has updated the Phone app for Android phones with a new feature called Calling Cards. This lets you create personalised calling screens for yourself and your contacts, which are displayed when you call them and vice versa.

Calling cards use the images and text style of your choice, and appear in both the Phone app and the Google Contacts app. To create your first card, open the Phone app and tap 'Get started'. If you don't see that option, tap the three-line menu button and select Settings, then 'Calling card'.



Press 'Add' and choose the contact you want to design a card for – or choose your own number. Tap 'Camera' to take a new photo, Gallery to select an image stored on your phone or Google Photos to use a picture from your library (see screenshot above).

On the next screen, choose a font and colour for the name in the calling card. Tap 'Done' to save the result, then press Add to create cards for other contacts.

As this is a new feature, we're not sure what happens when a contact who has created their own calling card calls you – whether you'll see

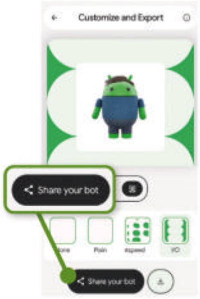
Best new apps What you should install this month

ANDROIDIFY

Free

Android tinyurl.com/APC553androidify

This Google app lets you create a custom version of the Android robot logo. Take a selfie, select a photo from your library or use a text prompt to describe your design. Choose a colour and tap Transform to generate your bot. You can then customise the background, download the finished image and share your bot with other people who may be amused.



BLACKMAGIC CAMERA

Free

Android tinyurl.com/APC553black

iOS tinyurl.com/APC553blackio

Blackmagic Camera brings advanced photography controls to your phone's camera, though not all devices are supported. It's been updated with single-lens and zoom control, new settings for exposure and focus, and a time-lapse option. Swipe left to quickly access the app's presets and right to use its programmable functions.

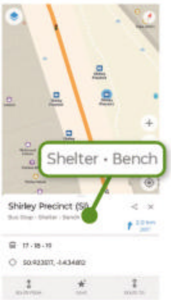
ORGANIC MAPS

Free

Android tinyurl.com/APC553maps

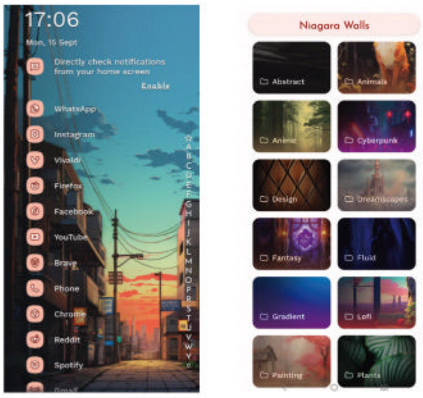
iOS tinyurl.com/APC553mapsio

This brilliant open-source mapping app has been updated to show the route numbers for buses. Tap a bus stop on the map and swipe up to view this info, as well as whether the stop has a shelter and bench. Organic Maps has also made it easier to see the locations of public footpaths without zooming right into the map.



*Contains in-app purchases

Best apps for... Alternative Android launchers


17:06
Niagara Walls
Abstract
Animals
Anime
Cyberpunk
Design
Dreamscapes
Fantasy
Fluid
Gradient
Lofi
Painting
Plants

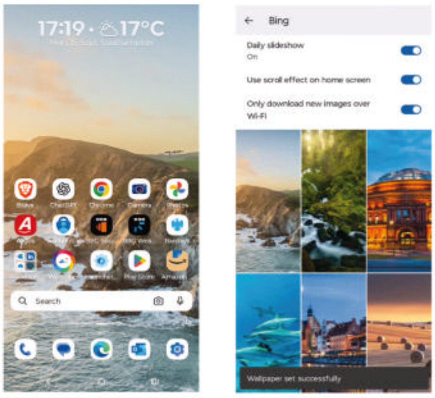
NIAGARA LAUNCHER

Free*

Android tinyurl.com/APC553niagara

With Nova Launcher shutting down, Niagara is a stylish alternative for launcher lovers. It presents your apps in an alphabetical, scrollable list with your favourites located at the top; offers useful widgets for your home screen; and can be customised with attractive themes and wallpapers. Some features require a Pro subscription, which costs US$13.99 a year.

Best for: Easy access to apps


17:19 · 17°C
Bing
Daily slideshow
Use scroll effect on home screen
Only download new images over Wi-Fi
Wallpaper set successfully

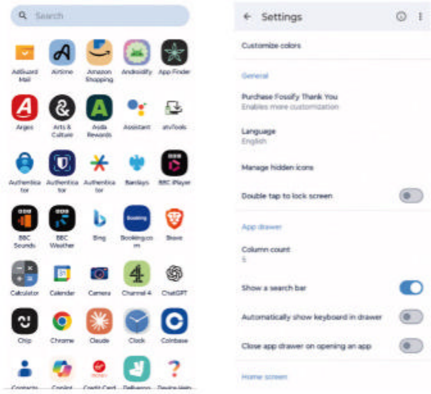
MICROSOFT LAUNCHER

Free

Android tinyurl.com/APC553launcher

If you don't mind its integration with Edge, Outlook, To Do and other Microsoft tools, this launcher looks great and won't cost you a cent. Add your favourite apps and widgets to your home screen; customise the layout and size of the icons; and automatically change the wallpaper every day to display images from Bing or your own photo collection.

Best for: Customising your home screen


Search
Settings
Customize colors
Language
Manage hidden icons
Double tap to lock screen
App drawer
Column count
Show a search bar
Automatically show keyboard in drawer
Close app drawer on opening an app
Home screen

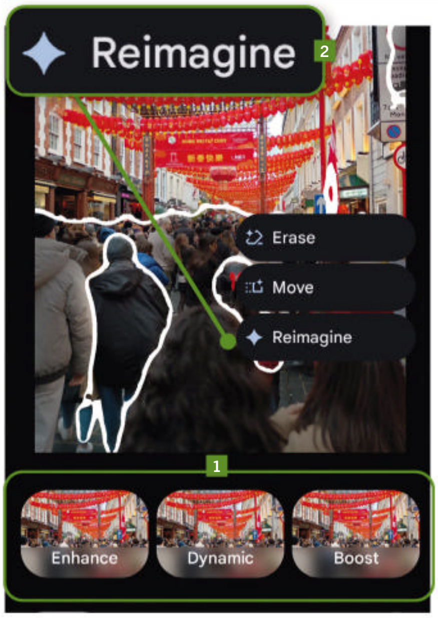
FOSSIFY LAUNCHER

Free

Android tinyurl.com/APC553fossify

For those seeking something clean and simple, Fossify Launcher is a no-frills, privacy-first launcher, with no ads or in-app purchases. Choose which apps to include on your home screen by dragging them from its searchable app drawer. Long-press the screen to add widgets, and open the launcher's settings to customise its theme, colour and number of columns.

Best for: Simplicity and privacy


Reimagine
2
Erase
Move
Reimagine
1
Enhance
Dynamic
Boost

the card they've designed or the one you've made for them. But it's certainly more interesting than using the default profile picture from your Google account.

ANDROID

EDIT IMAGES MORE EASILY IN GOOGLE PHOTOS

The Android version of Google Photos (**tinyurl.com/APC553photos**) has been redesigned to make it easier to edit images. It might not seem so at first because the editing tools have been reorganised into new categories, but nearly all are still available – plus a few new ones.

When you tap the Edit button on the bottom toolbar, Google Photos now offers three one-tap options to improve the quality of the picture: Enhance, Dynamic and Boost (1 in our screenshot left). You can also erase or move a particular element of a picture by swiping or drawing a circle around it, and choosing Erase or Move. A new Reimagine option 2 uses AI to customise or replace a selected object based on your text prompt.

Commonly used tools – including Crop, Sharpen and Magic Eraser – can now be found on the Actions tab, while Markup tools have a separate tab.

The Filters tab includes all Google Photos filters and sky styles and there are separate tabs for Lighting (including Brightness, Contrast and Highlights) and Colour (Warmth, 'Skin tone' and more).

The most notable omission is 'Colour pop', which popped out the subject of your photos against a black-and-white background. Google says it's working on restoring this option.

ANDROID & iOS

SHARE SONGS WITH FRIENDS USING SPOTIFY MESSAGES

Spotify has added a messaging feature, Spotify Messages, to its Android (**tinyurl.com/APC553spotify**) and iOS app (**tinyurl.com/APC553spotifyio**), which lets you share songs with family and friends. You could already do so by sharing via third-party apps such as WhatsApp, Facebook Messenger and Instagram, but the new option works directly within Spotify.

To try Spotify Messages, tap the Share button below the player controls in Now Playing mode. Select the person you want to share the current track with – Spotify will suggest people you've previously shared content with. If they're not listed, tap the Search button then Invite to invite them to Spotify Messages. You can then share the song in a chat, and they can respond with their feedback.

To disable the feature, and stop people sending you songs, tap your profile picture then 'Settings and privacy'. Select 'Privacy and social' and switch off Messages under 'Social features'. ■

DOWNTIME

News | Opinion | Development | Reviews

102 **News:** What's been happening in the world of gaming

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106 **Special report:** Nintendo's patent wins are a loss for everyone else

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112 **Game reviews:** The big and not so big new games we've played

116 **Tech report:** The legacy of the lockdown boom

118 **Tech tales:** The obsession with artisanal PC gear

120 **Why I Love:** The ethics of eating flesh

122 **Game changer:** *Prey*

Only Emiru's private bodyguards intervened.

Assault at TwitchCon

Questions for Twitch after high-profile streamer attacked at meet and greet event.

TED LITCHFIELD

Streamer Emily-Beth 'Emiru' Schunk has released a statement criticising streaming platform Twitch after she was assaulted at a TwitchCon meet and greet on October 17. This incident comes as high profile streamers, mostly women, have dealt with increasingly common incidents of in-person stalking and harassment by viewers.

In video on social media, a large man approaches Emiru, pulls her into a forceful hug and tries to kiss her. A bodyguard Emiru personally hired then rushes in to shove him away. The video ends as the man walks back into the crowd.

Twitch released a statement calling the incident "completely unacceptable and deeply upsetting". The company said that it has banned the offending individual from the convention, Twitch itself, and future in-person events.

Emiru released her own statement several hours later, criticising Twitch's treatment of her, and disputing part of its official statement. "I'm obviously shaken up by what happened and it's not the first time I've dealt with something like this," Emiru wrote. "But to tell you honestly, I am a lot more hurt and upset by how Twitch handled it during and after the fact."

> **"HE WAS ALLOWED TO WALK AWAY FROM MY MEET AND GREET"**

Emiru disputes Twitch's assertion that the offending individual was dealt with "immediately" calling it a "blatant lie". As can be seen in the video, the man was able to walk away from the meet and greet with no intervention from staff.

"He was allowed to walk away from my meet and greet and I

Take a break

WHAT'S NEXT?

REPO dev Semiwork has announced that planning for the next update is underway, but also that it is taking a well-deserved break. No timeframe was given, so it could be a while before we know what's next for the co-op horror, but hopefully we don't have to wait too long. ■

Dag dag!

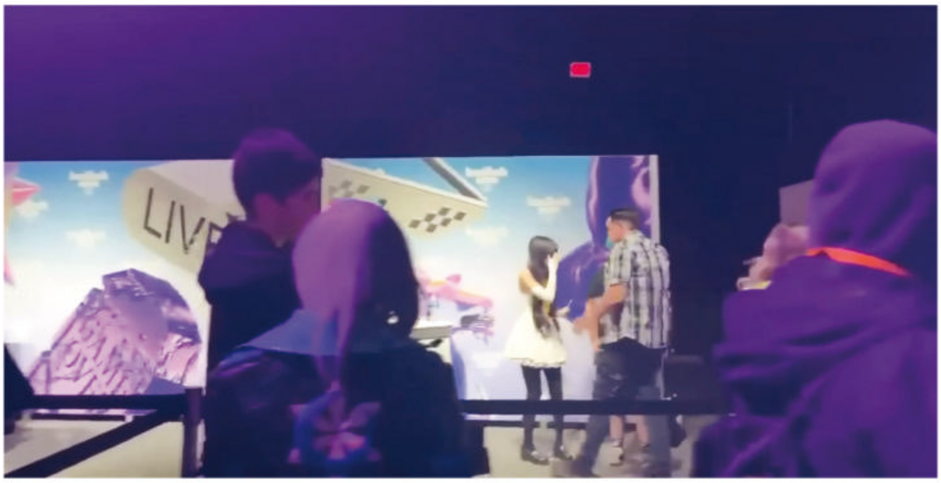
LEAVAING EA'S NETWORK

Some of *The Sims 4*'s biggest content creators left EA's Creator Network in the wake of the $55B Saudi-backed buyout. Kayla 'Lilsimsie' Sims, James Turner, and Jesse 'Plumbella' NcMara were among some of the biggest names to announce their departure from the community. ■

In time for Xmas

PRICES ARE SOARING

PC hardware prices are gifts that just keep on giving. Over the last couple of months, we've seen RAM prices shoot up to twice what they were, and manufacturers are blaming low stocks thanks to high demand for AI. Just in time for those Christmas upgrades. Wonderful. ■



TOP: The moment Emiru was attacked.

ABOVE: Twitch CEO Dan Clancy had to apologise.

didn't hear he was caught until hours after he attacked me," said Emiru. "And it felt like this only happened because of my manager pressing for it, not because TwitchCon staff present thought it was a big deal."

Emiru also stated that she was not checked on afterward by TwitchCon staff. In a further video clip from before the incident, Emiru said, "I kept my meet and greet because I wanted to keep my show." It's explained that her contract with TwitchCon meant that she was unable to cancel the meet and greet, despite wanting to over security concerns, without also cancelling her other event at the convention.

In March, Emiru and fellow streamers Valkyrae and Cinna were stalked and harassed on camera during a livestreamed event, with the individual even making death threats against them. Prior to the event, streamers publicly expressed reservations about attending that event.

Twitch's failure to adequately prepare for this incident despite so much advance warning, coupled with Emiru's sharp criticism of the company after the assault, means that the platform will have to deliver more substantial changes to win back trust and goodwill from some of its biggest streamers. ■

Highs & Lows

HIGHS

Time well spent

Tavern Keeper's dev 'burst into tears' when it reached Overwhelmingly Positive reviews on Steam.

Can't argue with him

John Romero delivered the correct answer when voting for the most satisfying weapon in gaming history: the Super Shotgun.

New Civ, who dis?

Civilization VII will get the option to play as one civ from start to finish.

Dead World

New World is dead: Amazon ends new content updates.

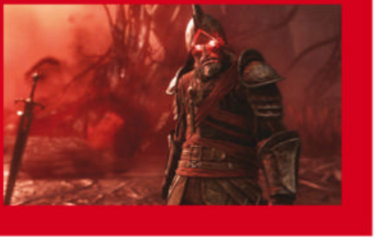
Just gross

US government uses *Halo* images in a call to 'destroy' immigration. Microsoft declines to comment.

What do execs know?

Capcom execs were bewildered that people might want to play original *Resident Evil* when GOG approached them about it.

LOWS



Incoming

THE BIGGEST GAMES ON THE WAY

1 month

RELEASE January 9, 2026

DEVELOPER Ice-Pick Lodge

PATHOLOGIC 3

The latest instalment in the Russian survival series casts you as a doctor who, with only 12 days to save a town, must make ruthless decisions and precise diagnoses.

RELEASE January 28, 2026

DEVELOPER Netmarble F&C

THE SEVEN DEADLY SINS: ORIGIN

A new open-world anime RPG where you must step into the shoes of Prince Tristan of Liones and proceed to explore the world of Britannia.

RELEASE January 29, 2026

DEVELOPER Bandai Namco Studios Inc.

CODE VEIN II

In a dystopian world overtaken by Revenants, play as a Revenant hunter who must travel into the past with a mysterious girl called Lou in order to save the planet.

2 months

RELEASE February 5, 2026

DEVELOPER Overhype Studios

MENACE

Get your turn-based tactics on in this fresh XCOM-like. Select, train, arm and lead a strike force against an alien threat in strategic missions that span different worlds.

RELEASE February 5, 2026

DEVELOPER Aspyr

DEUS EX REMASTERED

The legendary cyberpunk immersive sim is back, with this new remaster promising visual upgrades, quality-of-life improvements and all-new animations.

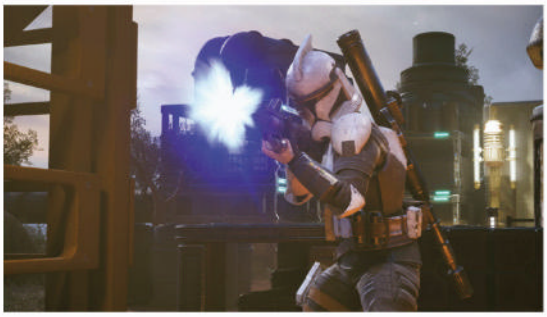
RELEASE February 27, 2026

DEVELOPER Capcom

RESIDENT EVIL REQUIEM

Return once more to Racoon City, the home of the mysterious Umbrella pharmaceutical company, as Grace Ashcroft, an intelligence analyst for the FBI.

3 months



RELEASE TBC

DEVELOPER Bit Reactor

STAR WARS ZERO COMPANY

What happens if you take the turn-based combat system from *XCOM* and smash it together with the Star Wars universe? *Zero Company* is what happens.

RELEASE 2026

DEVELOPER IO Interactive

007 FIRST LIGHT

Step into the shoes of James Bond before he attained his 00 status. From the makers of *Hitman*, this third-person action-adventure game promises espionage and quips.

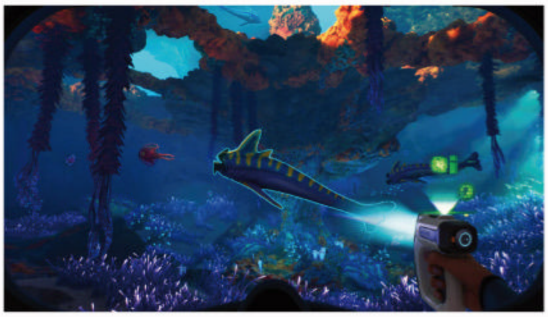
RELEASE 2026

DEVELOPER Capcom

ONIMUSHA: WAY OF THE SWORD

Wield a variety of deadly weapons as famous sword master Miyamoto Musashi. Incredibly visceral and kinetic combat is promised as Musashi fights through Edo-era Kyoto.

4 months+



RELEASE 2026

DEVELOPER Unknown Worlds Entertainment

SUBNAUTICA 2

An open-water survival game where you must craft vehicles, tools and bases to survive on a mysterious alien world. Visually, this is looking like a total treat.

RELEASE 2026

DEVELOPER Playground Games

FABLE

A reboot of the old action-RPG series originally crafted by Peter Molyneux's Lionhead Studios, *Fable* promises a visually spectacular return to the fantasy world of Albion.

RELEASE TBC

DEVELOPER Mundfish

ATOMIC HEART 2

The bonkers Soviet Union-themed *BioShock*-like returns for more violence. If you're a sucker for dystopia and retrofuturism then this is one to keep an eye on.

MOD

EL PHYREGO

We're seeing some good mods coming out now for *Vampire: The Masquerade – Bloodlines 2*, including this beautiful remodel of its female protagonist. Grab it here: **tinyurl.com/APC553blood**

Special Report

APC INVESTIGATES

Matter of timing

Nintendo's latest patent wins are a loss for everyone else.

Nintendo has had a lengthy history of legal skulduggery, but after initiating last year's patent lawsuit against *Palworld* developer Pocketpair, the house of Mario has descended into outright moustache-twirling IP villainy. September, however, saw Nintendo armed with a particularly troubling weapon for its legal arsenal: US Patent 12,403,397, a patent on summoning and battling characters that the United States Patent and Trademark Office granted with alarmingly little resistance.

According to videogame patent lawyer Kirk Sigmon, the USPTO granting Nintendo these latest patents isn't just a moment of questionable legal theory. It's an indictment of American patent law. "Broadly, I don't disagree with the many online complaints about these Nintendo patents," says Sigmon, whose opinions do not represent those of his firm and clients. "They have been an embarrassing failure of the US patent system."

The '397 patent wasn't Nintendo's only success with US patent officials in September. Just one week earlier, it had been granted US Patent 12,409,387, covering riding and flying systems similar to those Nintendo has been criticised for claiming in its *Palworld* lawsuit. Sigmon, an IP attorney with extensive experience in prosecuting and teaching patent law, says the patents reflect procedural irregularities in the decision making of US patent officials. And as a result, Nintendo has yet more tools to bully its competitors.

The flying and riding patent, Sigmon told *APC* "got a bit of push-back, but barely". After its initial application was deemed invalid due to similarities to existing Tencent and Xbox-related patents, Nintendo amended its claims based on interviews with the USPTO, which then determined that the claims were allowable "for substantially the same reasons as parent application(s)". "That parent case," Sigmon says, "had an even weirder and much less useful prosecution history."

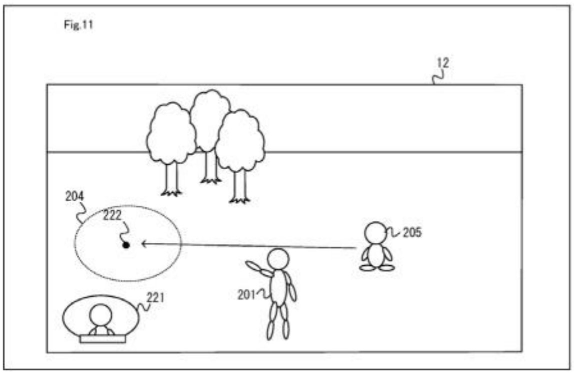
Most of the claims made in the '387 patent's single parent case, US Patent 12,246,255, were immediately allowed by the USPTO, which Sigmon says is "a very unusual result: most claims are rejected at least once". The only justification the USPTO offered was a block quote of text from the claims themselves.

To Sigmon, the '387 patent and its parent case rely on decisions that would have been obvious to a 'Person of Ordinary Skill in the Art' – a legal construct that holds if a patent's claims would reasonably occur to a practitioner in the relevant field based on prior art, those claims aren't patentable. "I strongly disagree with this result," Sigmon says, and with which we and most gamers would agree. "In my view, these claims were in no way allowable."

The '397 patent is even more striking. It's a patent on summoning and battling with "sub-characters" using specific language suggesting it's based on the

Patent catching

When it comes to IP matters, it's worth understanding 'prior art'. For something to be patentable, it has to be novel. If you can demonstrate a patent's similarity to preexisting work, it can be rendered invalid. As a result, patent language is hyperspecific. Theoretically, something must match a patent's claims word-for-word to qualify as infringement. But a bogus lawsuit can still cost millions.

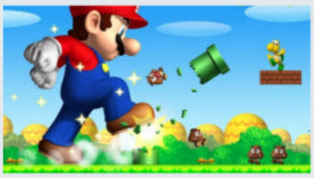


FAR LEFT: If your game looks like this, consider prayer.

LEFT: *Scarlet* and *Violet*'s patented "sub-character" mechanics have sparked an outcry.

MARIO COURT *Recent highlights from Nintendo's grisly legal record.*

FEBRUARY 2022
Nintendo ROM hacker Gary Bowser is sentenced to spend three years in prison and pay a $14.5 million fine.



MAY 2023
Nintendo prevents the Steam release of open source Wii emulator Dolphin by threatening to pursue a DMCA lawsuit.

MARCH 2024
Blamed by Nintendo for *Tears of the Kingdom* piracy, Switch emulator Yuzu agrees to pay $2.4 million in settlement.

APRIL 2024
Garry's Mod developers are forced to purge more than 20 years of Nintendo-related creations from its workshop.

Let's Go! mechanics in the *Pokémon Scarlet* and *Violet* games. Despite its relevance to a conceit in countless games – calling characters to battle enemies for you – it was allowed without any pushback whatsoever from the USPTO, which Sigmon says is essentially unheard of.

"Like the above case, the reasons for allowance don't give us even a hint of why it was allowed: the examiner just paraphrases the claims (after block quoting them) without explaining why the claims are allowed over the prior art," Sigmon says. "This is extremely unusual and raises a large number of red flags."

USPTO records show that the allowance of the '397 patent was based on a review of a relatively scant number of documents: 16 US patents, seven Japanese patents, and one article from Pokémon.com. The

'397 case was originally filed as a Japanese patent application, which would allow the USPTO examiner to use the existing progress in the Japanese case as a starting point for their review. But, Sigmon says "even that doesn't excuse this quick allowance". Continuing: "This allowance should not have happened, full stop."

UNDER THREAT

On paper, the patent might not seem like a threat to Nintendo's competitors: patent claims must be met word-for-word to be infringed, and the claims as constructed in the '397 outline a specific sequence of events. "Pragmatically speaking it's not impossible to be sued for patent infringement even when a claim infringement argument is weak, and bad patents like this cast a massive shadow on the industry," Sigmon says.

For a company at Nintendo's scale, the claims of the '397 patent don't need to be bulletproof. Just the threat of a potential lawsuit can stifle competition well enough when it would cost millions of dollars to defend against.

Sigmon, who says he's helped inventors protect their inventions from IP theft perpetrated by major companies, insists that the patent system still has merit. "That's the kind of thing that patents are meant to do," he says. "They were not made to allow a big player to game the system, get an overly broad patent that they should have never received in the first place, and then go around bullying would-be competition with the threat of a legally questionable lawsuit."

"THIS IS EXTREMELY UNUSUAL AND RAISES A LARGE NUMBER OF RED FLAGS"

Unfortunately, Nintendo has gained these patents at a moment when the USPTO has made challenging bad patents more difficult. Currently, US patent officials under USPTO acting director Coke Morgan Stewart have been refusing to hear a huge number of Inter Partes Review cases for "discretionary" reasons.

"Realistically, this means that patent validity issues are being relegated to lawsuits: not a good situation, as that often entails millions of dollars in costs and a lot of risk," Sigmon says. "In practice, this means that bad patents get to fester on the market for longer and provide a bigger threat for the industry as a whole." ■ ***Lincoln Carpenter***

The Outer Worlds 2

Outshines its predecessor.

TED LITCHFIELD

***The Outer Worlds 2* was a slow burn at first, and it was the midgame, act two climax that won me over. It includes a pair of classic Obsidian conversation boss fights, and I had a big, dumb smile on my face as I contemplated dialogue options – some available to me, some greyed-out – gated by skills, background traits, quest choices and even an out-of-the-way optional conversation I'd had ten hours previously.**

Since I specialised in speech and had gone for nonviolent resolutions whenever possible, I was able to pull off a satisfying 'everybody lives!' conclusion to these missions. Comparing notes with a friend of mine that was also playing it, and who adopted a more trigger-happy playstyle, he was locked into a less happy path where somebody had to die, with the choice potentially locking him out of at least one ending and turning a companion hostile. This nexus of consequences and options stemming from my prior choices and the type of character I made is pure RPG to me, and exactly what I look for in an Obsidian game.

I liked but didn't love the first Outer Worlds – it felt like a compromise role playing game for genre newcomers, one which was fun enough and went down smooth, but didn't leave a huge impression. *The Outer Worlds 2* is a more ambitious, complex, and surprising game, while still being easy to grasp as far as big RPGs go.

It doesn't have the standard-setting sense of scale, simulation, or reactivity that's wowed me in recent RPGs like *Baldur's Gate III*, *Kingdom Come: Deliverance*, or *Disco Elysium*, but *The Outer Worlds 2* is a great action-RPG whose skill system, writing, quests and level design seriously impressed me as a longtime role playing game head who likes his games crusty, impenetrable and unfair. So this is great for me.

FAR FLUNG

The Outer Worlds 2 takes place in a new space colony, Arcadia, completely separate from the first game's Halcyon. The oppressive, collectivist, and highly advanced Protectorate of Arcadia has been invaded by the consolidated megacorp, Auntie's Choice, formed from a merger of two of the first game's cheekily evil companies.

One thing I'd never accuse *The Outer Worlds* series of is subtlety: the sequel's big conflict pits two caricatures against each other. It's mandatory stints in government re-education camps vs 20-hour work days with no bathroom breaks, and it made me miss the more well-rounded, thought-provoking conflicts in prior Obsidian games. But it does a good enough job of lending stakes to *The Outer Worlds 2*'s sense of Forbidden Planet raygun swashbuckling, and there are some great human dramas and smaller conflicts sprinkled throughout that really got their hooks in me.

> **Judge Dredd space cop Tristan Rao quickly stole my heart**

I really dig *The Outer Worlds 2*'s companions as well: even Nice Guy Human Warrior Starter Buddy Niles Abara has an interesting twist to his character, while hammer-wielding Judge Dredd space cop Tristan Rao quickly stole my heart by more or less speaking in all-caps.

Another companion has a complicated, spoiler-heavy recruitment mission in which it's not even clear from the outset they can join your crew, and it's perfectly easy to kill them by mistake.

CRUNCH THE NUMBERS

The Outer Worlds 2 manages a real coup by streamlining the first game's RPG system to ultimately build something with greater depth. Attributes are gone, and at character creation you pick positive and negative traits, background and tagged skills.

There are 12 skills in total, and tagging one gives you two free points, while you get another two to spend at every level up. I felt constrained in a good way by this system: you can't minmax yourself into being good at everything (or everything that matters) like you might in *Fallout* or *Baldur's Gate III*, and every build will have some opportunities closed to it.

The best perks – like the one that applies half your sneak attack damage to regular melee attacks – require steep skill investments. Ditto for the most impactful skill checks in dialogue or exploration. These are static checks where you either have the points or you don't, as opposed to dice rolls you might win through luck or quickloading.

With that in mind, I found investing in four of the 12 skills had me comfortably at capacity in terms of keeping up with tough checks and getting the perks for my build. There were often quest solutions or routes

WHAT IS IT?
A breezy first-person RPG in a future that's part raygun, part deco

EXPECT TO PAY
$109.95

DEVELOPER
Obsidian Entertainment

PUBLISHER
Xbox

REVIEWED ON
Intel Core i5 12600K, 32GB RAM, AMD Radeon RX 9070 XT

STEAM DECK
Unsupported

WEB
outerworlds2.obsidian.net

PERKY

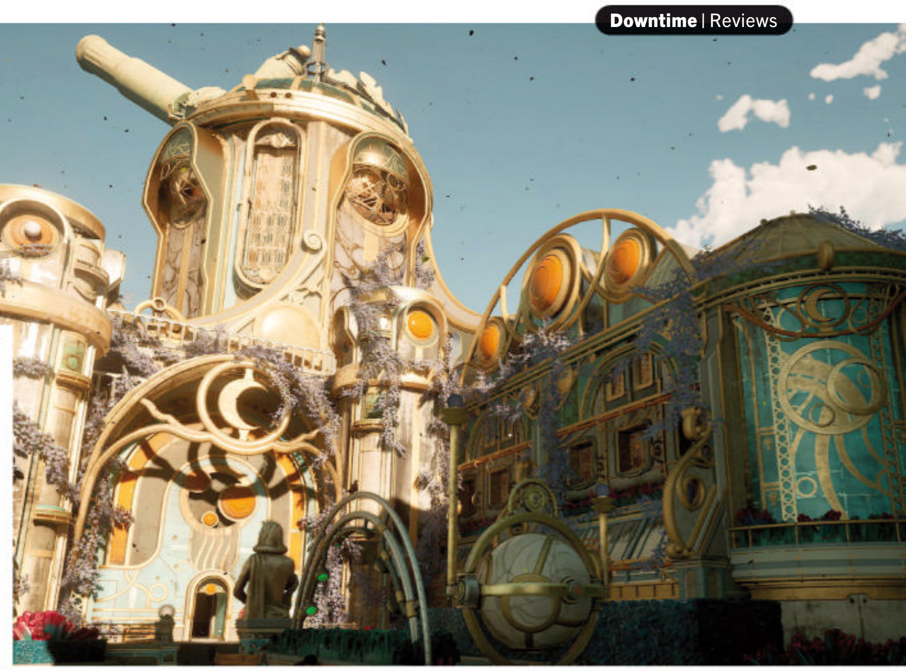
The best perks to change your playstyle

SPACE RANGER Deal more damage the higher your Speech skill, get exclusive dorky dialogue lines.

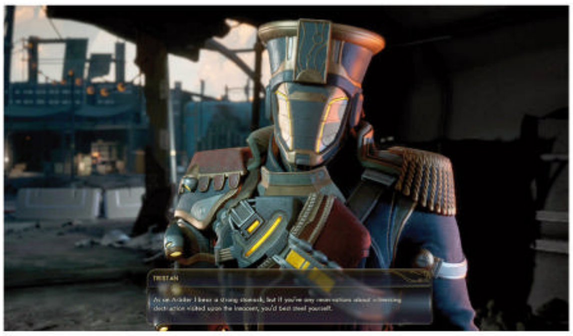
SLEIGHT OF HANDS Your Lockpick skill gives bonus sneak attack damage, and it's easier to pick pockets.

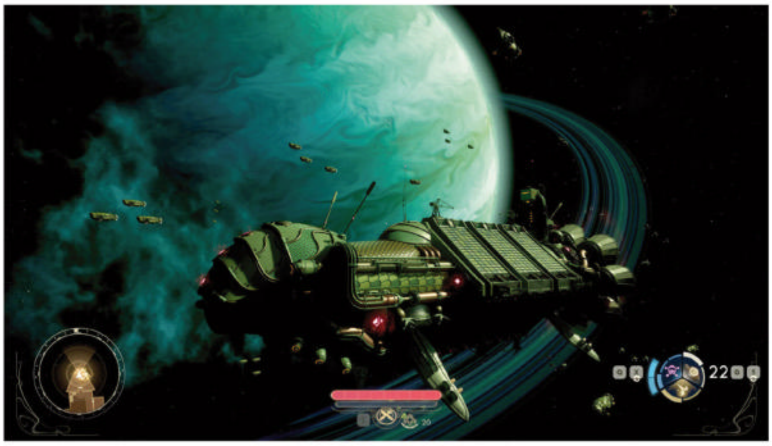
VITAL STRIKER Deal half your sneak attack bonus on normal light melee attacks – turns a knife into a nuke.

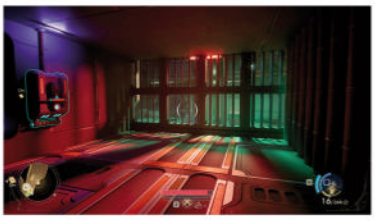
N-RADIATOR Every few seconds, deal double damage in the form of purple space energy. Handy when you're surrounded by enemies.



Damn steampunk cosplayers built their own city.

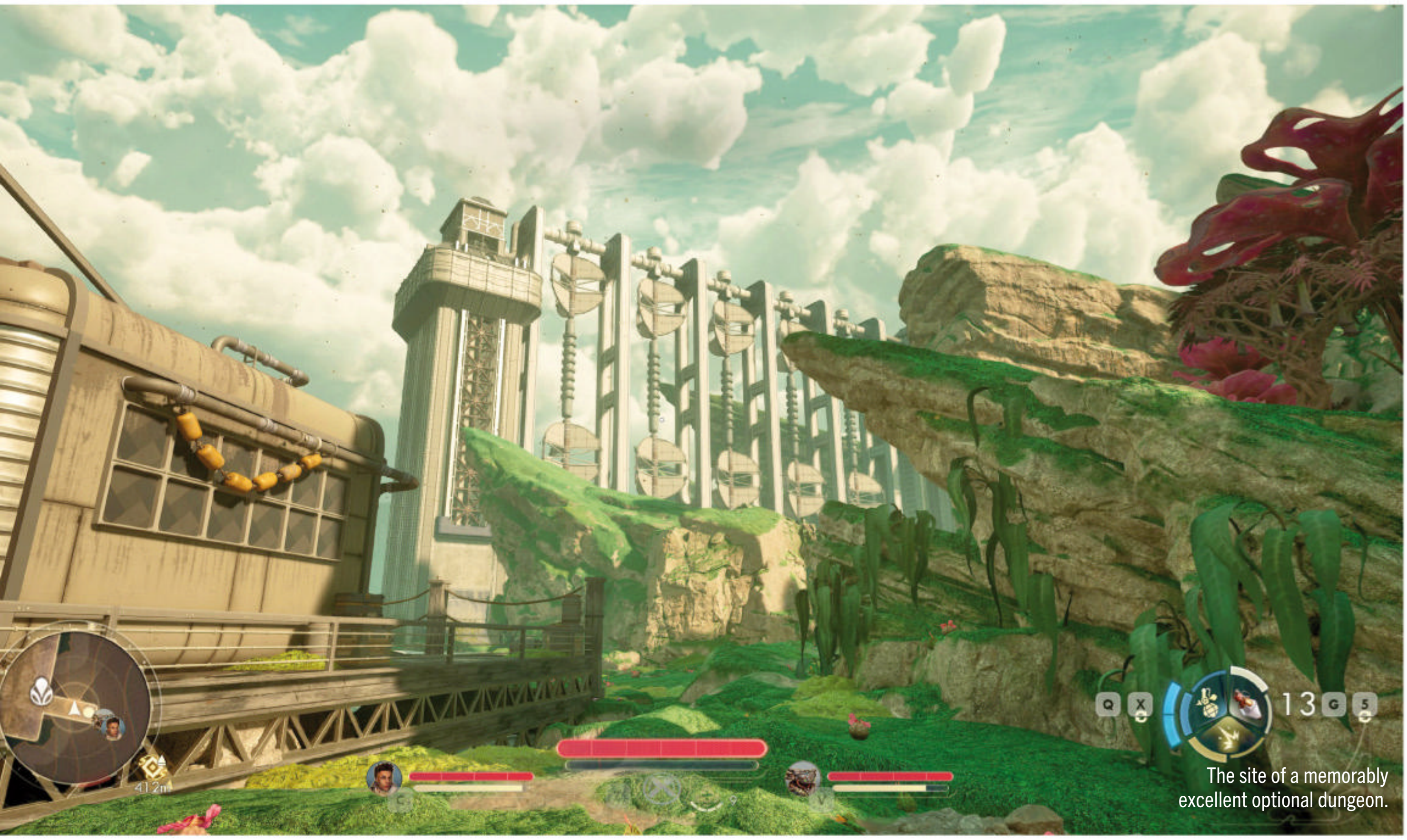




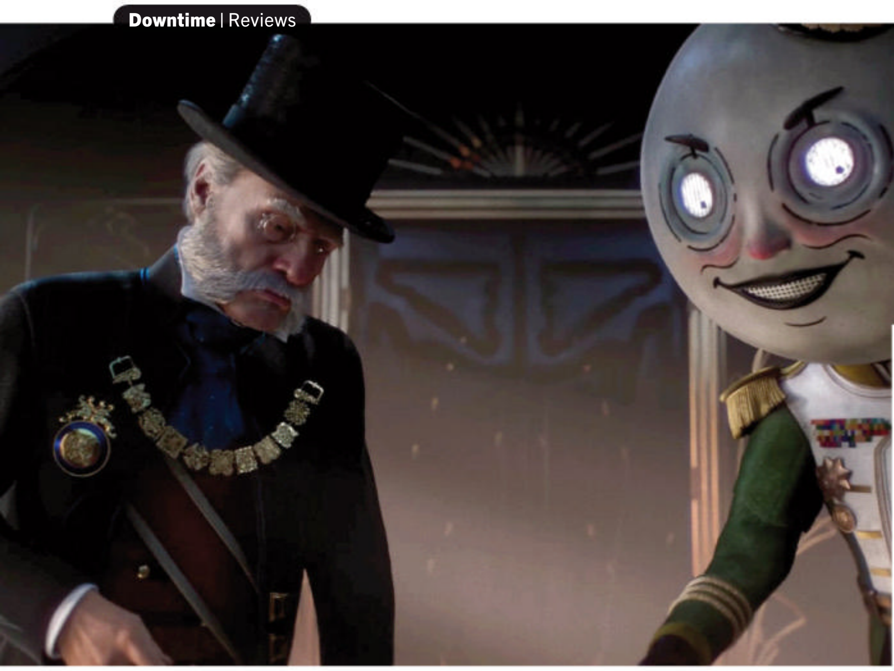


TOP LEFT: Problematic fav Tristan Rao.

FAR LEFT: Battlecruiser operational.

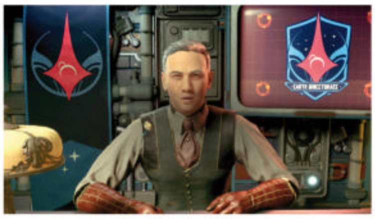


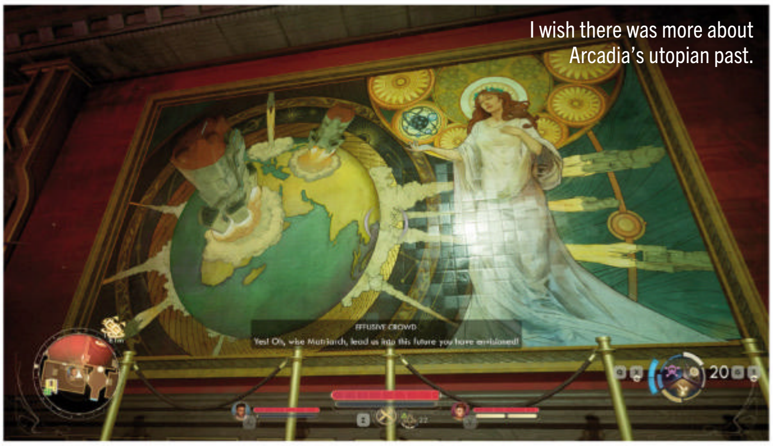
The site of a memorably excellent optional dungeon.



ABOVE: Moon face.

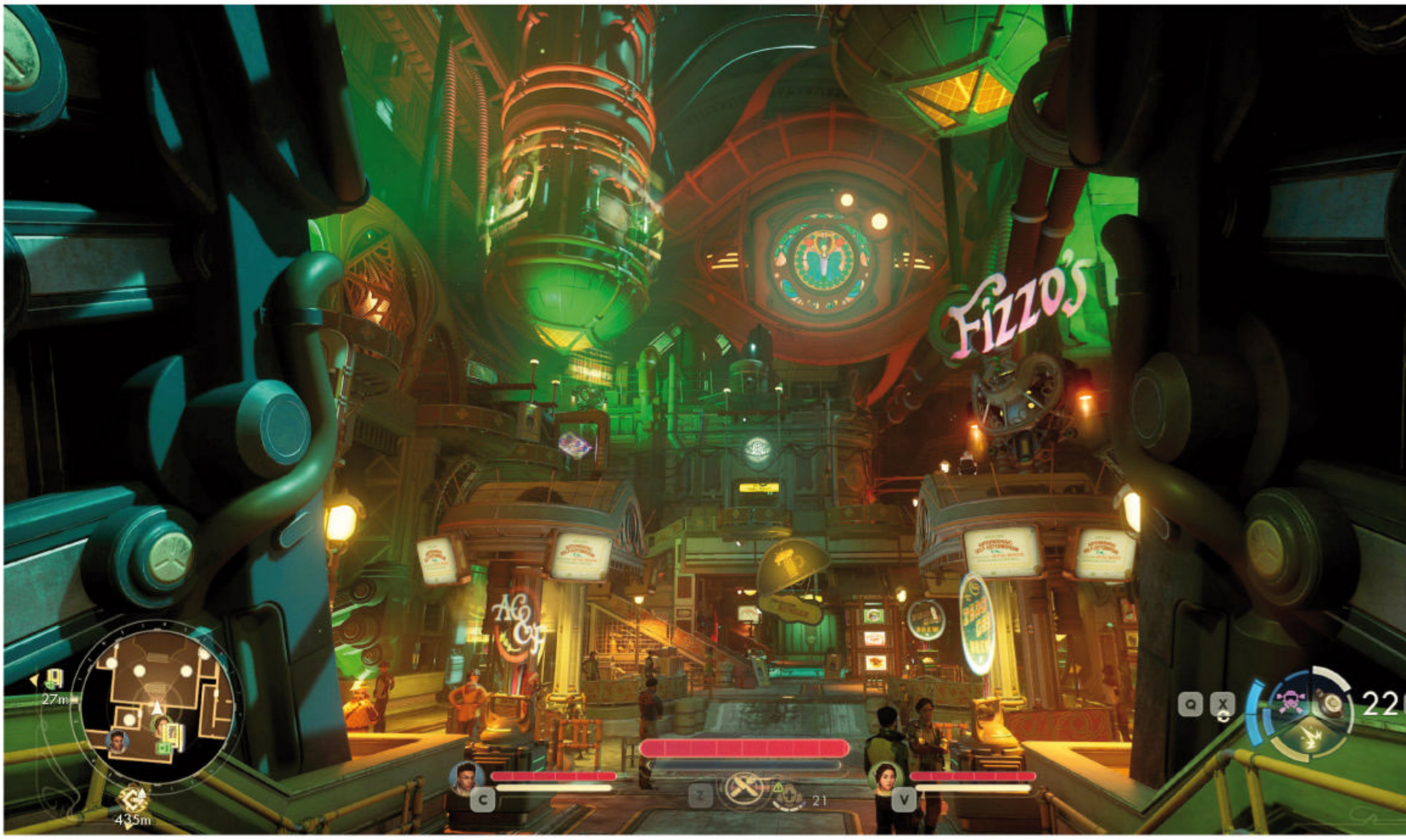
BELOW: It's supposed to be overwhelming.

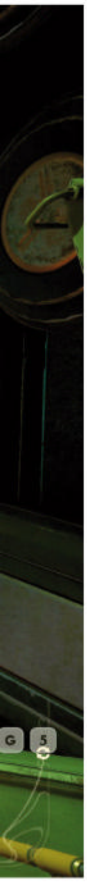




I wish there was more about Arcadia's utopian past.

EFFUSIVE CROWD
Yes! Oh, wise Matriarch, lead us into this future you have envisioned!





that were completely closed to me because of how I built my character, and I appreciate that. It makes those character building choices more meaningful, and results in one playthrough potentially feeling very different from another. *The Outer Worlds 2* is also great at offering multiple solutions to the same problem: a high speech check can sometimes be circumvented by a trait or quest decision, while locked doors often have alternate paths or keys you can search out.

FLAWED HERO

So far, that's all well-structured and balanced, but not anything entirely new. *The Outer Worlds 2* does have one genuinely surprising innovation, though, and that's the Flaws system. This wasn't anything to write home about in the first game, and I did not come in expecting to love the new mechanics as much as I did.

You're given the option to accept or reject a flaw once you hit hidden thresholds of player behaviour: combat tactics, how you talk to people and what items you choose to keep, sell or dismantle are a few examples. Each flaw has both detrimental and positive effects, and is a potential game-changer (or game-ruiner). There's a real sense of humour and imagination to the behaviours the game keeps track of and calls you out on, and it strikes me as such a cool RPG experiment to alter characters not only based on conscious decisions by the player, but how they unconsciously approach the game.

My favourite has been Foot In Mouth Syndrome, which you're offered after skipping enough dialogue lines. You get a pretty substantial bonus to all experience points received, but also have a timer counting down when selecting dialogue choices. If you take too long, the game will just do it for you, a karmic punishment for frequent dialogue skippers.

The Outer Worlds 2 is a great game for buildcrafting sickos: I was able to stack enough bonus sneaking movement speed to crouch-walk as fast as I sprinted, and I've selected abilities that make my combat knife hit harder than a two-handed space warhammer. There are a ton of items and perks to make non-combat skills contribute to your damage: my favourite is the Space Ranger perk, which gives a damage bonus based on your speech skill, and opens up dialogue options that sound like Zapp Brannigan.

As for moment-to-moment combat, you've played this game before. *The Outer Worlds 2* feels comparable to *Fallout 4* when rubber hits the road: much better than something like *New Vegas* or *Skyrim*, but definitely a worse action game than *Cyberpunk 2077*, or even Obsidian's own Avowed from earlier this year. The guns all feel great, but melee weapons are imprecise and sluggish, a feeling ameliorated somewhat by the satisfying impact of chunky two-handers, or the absurd spectacle of a dinky knife slash obliterating a miniboss' health bar thanks to a well-optimised build.

> **I ran into a new species of lizard gorillas on a later planet**

DIFFICULTY CURVE

This is also an RPG with a really bad reverse difficulty curve and uneven challenges throughout. The first few hours were touch and go, especially since I started on a higher difficulty based on an easy demo experience. After a few hours of things dialled down to Normal, I was enough of a ninja god to need to crank the difficulty back up again. But 25 hours in, I ran into a new species of lizard gorillas who could kill me in one hit, and were tougher than most boss fights.

SURE SATISFACTION

It's a more or less stable experience, but I've had a few bugs take a piss in my coffee, and *The Outer Worlds 2* runs 'good for an Unreal Engine 5 game' as opposed to just plain 'good'. One of the worst glitches occurred when my man Tristan spawned underneath the map on my ship when I needed to talk to him and close out a quest, an issue that persisted when I loaded a save or left and came back. I even saw companions have one-sided ghost conversations with the absent Tristan while he was stuck in the walls, their entreaties met with silent subtitles. Thankfully, a combination of loading older and newer saves over and over shook something loose and delivered him from the Shadow Realm.

My other big glitch frustration has been some wonkiness around enemy aggro and detection, which is particularly noticeable on a stealth build: sometimes entire groups will be alerted to me out of nowhere, or enemies will spawn already aggroed after I've painstakingly snuck past a room full of guys. There's an entire settlement on the first planet that only figures in the diverging critical path I didn't take, and sneaking in the back to see what I missed alerts the entire base, filling my screen with a sea of red exclamation points.

But that's an acceptable level of RPG jank for me, annoyances – some of which may still be fixed post-launch – that don't manage to sully the experience as a whole. *The Outer Worlds 2* is not a new Obsidian all-timer, but it's one of the best games I've played this year and an RPG I'll happily revisit down the line. Some of its balance and mechanical quirks can be frustrating, particularly early in a playthrough, but enduring them is well worth it. ■

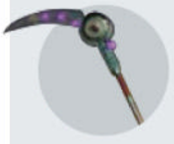
VERDICT

★★★★☆

Another Obsidian heater, a fun and whimsical RPG with surprisingly deep character building.

SWAGGED OUT

Unique gear has all the fun of a Destiny exotic

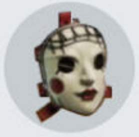


PROTOTYPE N-RADIATED SCYTHE

A purple space scythe.

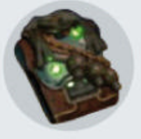
SPECTRUM DANCE SABER

Time your attacks to the beat to deal bonus damage.



MENACING MASK

Adds 10% of your sneak attack to normal melee strikes.

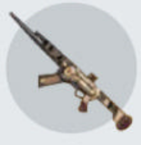


ESCAPE SUIT

Drop a smoke bomb and turn invisible when you're low on health.

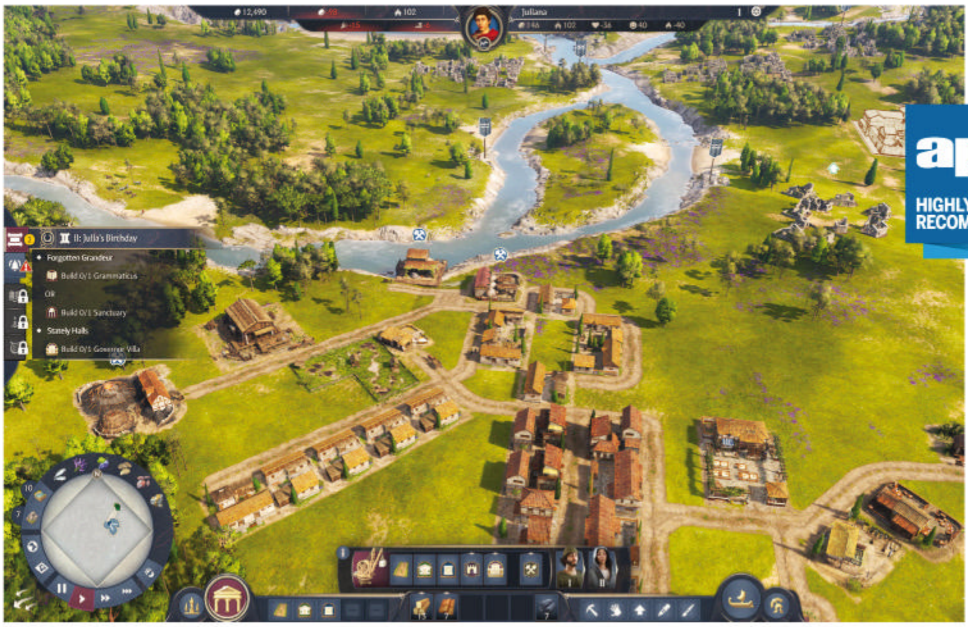
MURDER'S BEST FRIEND

Do more damage for each stealth kill you make.



THE ORACLE

Aimbot gun. This assault rifle locks on to targets, but you'll need a key to get it.



apc
HIGHLY RECOMMENDED

PRICE $89.95 **PLATFORM** PC, PS5, XBS/X **WEB** tinyurl.com/APC553anno

Anno 117: Pax Romana

Gives you space to Rome.

It wasn't built in a day, but this latest *Anno* in a long-running series of accessible and endearingly twee city builders doesn't take that old adage entirely to heart. There's complexity to its supply chains and economy, but it takes a ruthless writer's pen to the systems-bloat and perplexing menu rabbit holes found elsewhere in the genre. As a result, overseeing a burgeoning Roman territory feels far less like filling in a tax return than other city builders, and more like the power fantasy that we probably all showed up for in the first place.

It will feel like stepping into worn-in old shoes to *Anno 1800* players: you begin by clicking on the resource you'd like your citizens to start making, then – from a pop-up menu which shows you the buildings required to make it – you drop the necessary structures into the world. Simplicity itself, and enough to make you wonder why almost every other game does this process in reverse.

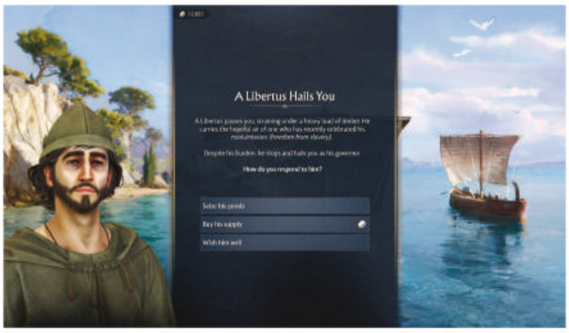
There's plenty of subtlety to even this most basic action, though. Placing those structures in positions that are geographically close to the resources they need, close to each other, and also in areas that might trigger productivity or happiness bonuses, is not easy to achieve, and introduces a nice puzzle-like wrinkle to the way you lay out your cities.

There's a lot of character to every building. Enough that I found myself regularly zooming right in on each one just to watch a day in the life of its workers. Meanwhile at mid-zoom, the combination of dramatic clouds, rolling hills, burning braziers and gently lilting wheat fields is enough to relax all the muscles in your neck that stiffen during a day of living life in 2025.

The military element doesn't kick in for quite a while in the narrative campaign and isn't a primary focus, but it's there. So are your advisors, popping up with dilemmas for you to resolve.

There isn't a confident stride forwards here from *Anno 1800*'s very accomplished refinement of the age-old *Anno* experience. And there didn't need to be, especially. Instead, *Anno 117* finds a reason for being with its setting and characterisation, giving you new resources and supply chains using a ready-made and polished interface. At times it borders on so friendly and non-threatening to your endeavours that you feel like you could leave it unattended for an hour and return to find everything absolutely fine.

Most of the time the experience of letting *Anno 117* wash over me at its own pace is actually therapeutic. Order is relatively easy to achieve in this realm, and although there are forces who periodically threaten it, they're neither numerous nor vicious enough to disturb an overall atmosphere of Sunday night TV. ■



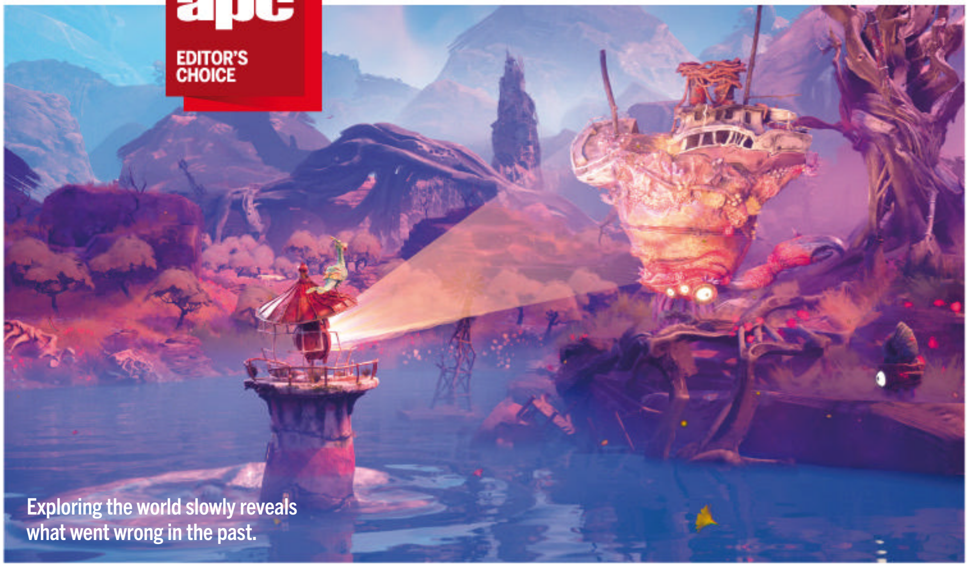
VERDICT

★★★★☆

Polished city-building that goes the extra mile to create character and meaning to your block-dropping feats.

PHIL IWANIUK

apc EDITOR'S CHOICE



Exploring the world slowly reveals what went wrong in the past.

PRICE $44.95 **PLATFORM** PC, XBS/X **WEB** tinyurl.com/APC553keep

Keeper

A bite-sized adventure game that draws on Double Fine's best work.

***Keeper* can't be accused of chasing trends. It doesn't have hyper-realistic graphics; it doesn't have crafting; it doesn't have a battle pass; it doesn't even have humans. It's a game about a lighthouse and a bird going up a mountain that ends in around six hours.**

But all six hours of it are gorgeous. Leave it to Double Fine, the developer that made a level out of psychedelic album art in *Psychonauts* 2, to create an entire experience that feels like exploring a surrealist painting: a trip through an alien-looking planet that glows with pinks and greens and oranges, starring a sentient lighthouse with spider legs. *Keeper* is an adventure nobody else could make, and one of Double Fine's best.

The story about the lighthouse and the bird starts slow and builds momentum until its very last moments. Like a deep breath, it slowly builds up, pauses for a moment, and then releases in one final burst. It's a wordless game best played in as few sessions as you can to get the full effect of its pacing.

The platforming and puzzles are typically Double Fine in quality.

While I never found a puzzle in *Keeper* that couldn't be solved by poking around until all the pieces came together, I savoured each one for the small hints at what the planet was like before its fall. A puzzle as simple as pushing an orb to the right location revealed the fine craftsmanship of a lost civilisation as I followed a metal tube I had mistaken for set dressing all the way back to the start of an area.

Once I started to pick up on the theme for each level, I realised how masterfully each scene had drawn my eye toward important points of interest. By the end, I could tell you my own idea for what happened based purely on my interpretation of what I found in my playthrough.

Keeper is a brilliant example of how a smaller, focused vision can still dazzle. Double Fine games are always gems, but *Keeper* is one of the brightest yet. ■

VERDICT

★★★★½

The tightly designed puzzles and cerebral platforming showcase what makes Double Fine's games so special.

TYLER COLP

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apc HIGHLY RECOMMENDED

PRICE Free
PLATFORM PC, Mac
WEB tinyurl.com/APC553game

I MADE A GAME FOR YOU

Play Dad's FPS.

I Made A Game For You is a solid, cartoony FPS, but it's also a conversation between a father and daughter. Your dad has made this game, and you're playing it to keep him happy. If only he wouldn't keep texting to ask what you think about it, particularly when you're in the middle of a firefight.

On the one hand, you're playing an FPS in the traditional fashion, strutting your stuff with WASD and waggling your eyeballs with the mouse, while the right mouse button has been reserved for communication. Every time your dad sends a message, you have to hold the button down to automatically reply, which shrinks the action down to the middle of the screen and overlays their messages atop it.

You can still move and shoot while chatting with Dad – with great difficulty – but it's probably best to run for cover, all while swearing at his inopportune timing. If it sounds annoying, it kind of is, but that's the point and it's very funny, seeing her reaction to Dad's perfectly timed intrusions.

VERDICT

★★★★☆

An enjoyable FPS that's also a clever commentary on itself. Both parts combine to tell one great story.

TOM SYKES

PRICE Free
PLATFORM PC, browser
WEB anstabo.itch.io

SUMMERFALL

Collecting stones for some reason.

Summer is nearly over, and you have stones on your mind. Big stones, little stones, precious gems, even gold: all are waiting to be uncovered in your little plot of land. *Summerfall* gives you this plot to explore, to dig and to fish, as the final sunset descends on your summer holiday.

All with the aim of gathering those stones, which grant you tangible benefits. If slotted in your backpack, they might increase your jump height, or improve your chances at catching something juicy from the lake. However, the stones slow you down, so you'll regularly need to dump them back at your cabin. As your mineral quest advances, you'll acquire a clutch of special tools, including a shovel, fishing rod and even a skateboard.

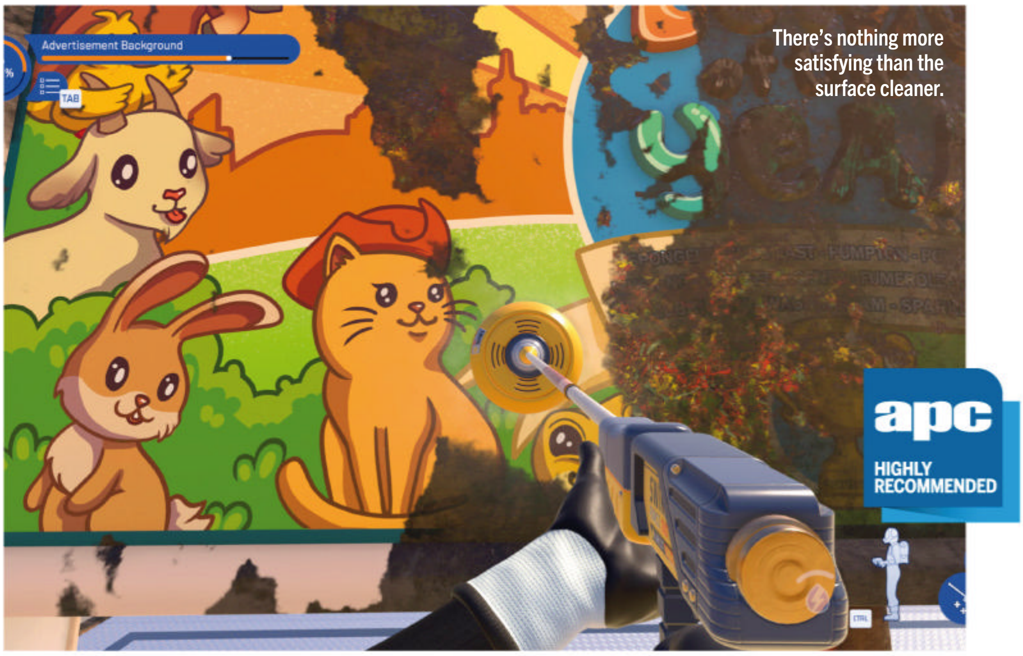
You'll spend the majority of *Summerfall* traipsing about on foot, and repetition sets in quickly, and hits hard. You'll dig, fish and gather at the same spots ad nauseam, hoping to uncover the vital tools that you need to continue before boredom drives you to quit. ■

VERDICT

★★½☆☆

Rather than wanting an endless summer, you'll be waiting for autumn to roll around.

TOM SYKES



There's nothing more satisfying than the surface cleaner.

PRICE $34.95 **PLATFORM** PC, XBS/X, PS5 **WEB** tinyurl.com/APC553wash

PowerWash Simulator 2

Zone out, rinse, repeat.

Some of us will do just about anything to avoid having a thought, so let's talk about a particularly good thought-eradicator: *PowerWash Simulator*. It plays a lot like the name suggests. You get a beefy hose, fancy attachments and hop from client to client blasting grime off of surfaces, and that's its biggest appeal: just the raw, sensory satisfaction of stripping dirt off of things.

It's the perfect brain treat when I both want and do not want to do something. As you can imagine, there's not a lot about powerwashing to change or expand on in a sequel, but *PowerWash Simulator 2* didn't need to reinvent spraying water at dirt to be worthwhile, just refine it, and it does.

Among *PowerWash Simulator 2*'s improvements are fresh new attachments for scrubbing grime and soapy buffs that remove unnecessary tedium. best example of that. While I do get some satisfaction out of slowly running powerful wide-spray nozzles back and forth in straight lines over large, flat surfaces, it's not something that holds my attention long.

The surface cleaner makes quick work of less detailed tasks without forfeiting the feeling of satisfaction that comes from hosing down bigger areas with a controlled, deliberate spray. Blasting rust and dirt from an old billboard was my first job with the specialised washer, and the beginner job now sits among my favourites. If you're into the meditative motions of the first game, then I'm here to tell you that this new toy absolutely delivers.

New home base projects where you powerwash and arrange furniture in a personalised space add another opportunity for small-scale solo projects, but the system sits on the cusp of fun in the beginning and never improves. It's kind of like a mini furniture restoration side gig.

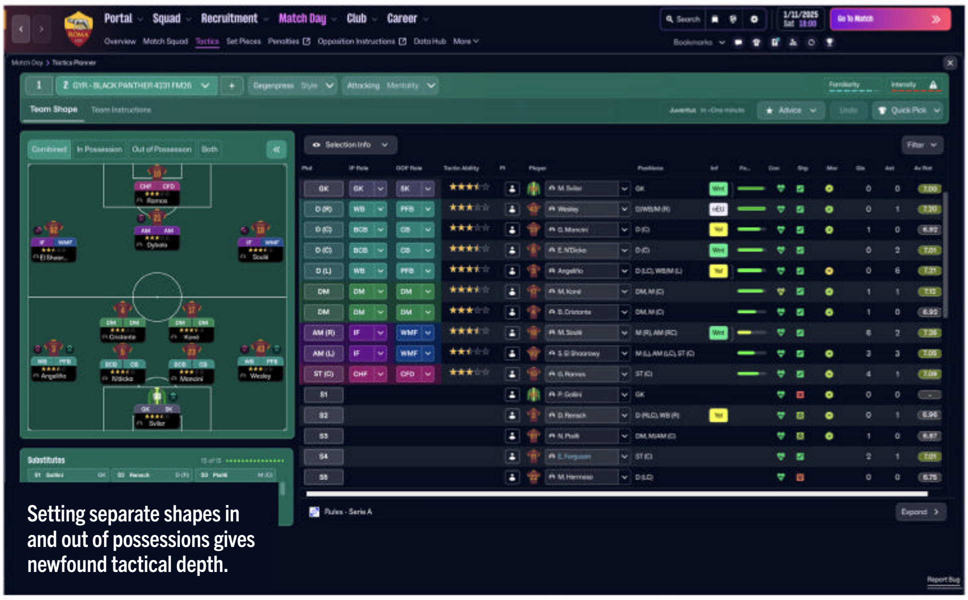
This sequel is a major upgrade in ways that are insignificant alone, but game-changing as a whole. If I could muster this kind of enthusiasm for any real-life task just as boring I'd be unstoppable. ■

VERDICT

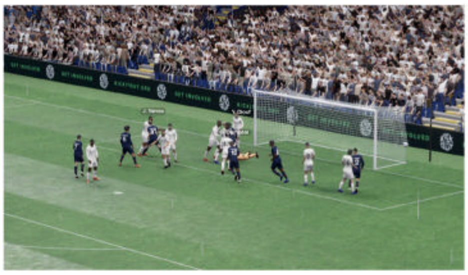
★★★★☆

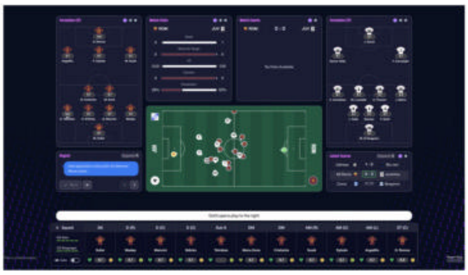
PowerWash Simulator 2 is a delightfully monotonous chore sim that tweaks the original formula just enough.

ANDREA SHEARON



Setting separate shapes in and out of possessions gives newfound tactical depth.





PRICE $94.95 **PLATFORM** PC, Mac, XB Cloud **WEB** footballmanager.com

Football Manager 26

Thrilling on game day, like treacle everywhere else.

How to improve *Football Manager*. Is it a matter of making it a more technically impressive affair? Sports Interactive evidently thinks so. Simply put, matches look more like real football. Now running in Unity, but most importantly with a deeper fidelity and variety of player animations in the match engine, *Football Manager 26* shows you details that weren't there before.

My manager's eye can now better observe how well a team holds its shape out of possession, watch impact subs skin their markers with their fresher legs, and note when my centre-backs are pulled out of position. But the gamer in me just likes watching the cool goals go in.

The intention of this redesign is to show you more information on each screen. SI probably thinks the benefits of this are twofold: less clicking between menus, and an at-a-glance overview of just how deep *Football Manager 26* 's simulation goes, in order to create a real sense that there's a living, breathing world of football beneath all the numbers.

In practice, it's like someone breaking into the home you've lived in for the last 15 years, rearranging everything and leaving incredibly detailed notes on all the cupboard doors about where all your stuff is now. I've spent so much time scanning through extraneous information for the one stat I'm looking for, not because it's not present in a particular menu, but because 9,000 other things are too.

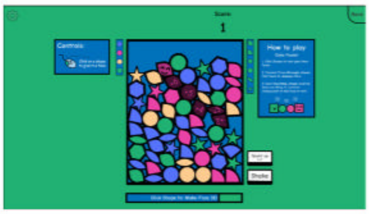
Look, it's not a disaster. It's functional enough and over time you do learn its ways. There's even a bookmark system which lets you pin your most-used menus to the 'portal' page, a redesigned hub menu intended to work like your career save's homepage. Ironically though, that bookmark section is sharing that portal's real estate with such an absurd number of other elements that it's easy to miss, and the icons are so small that it feels fiddlier to use them than to navigate to your intended menus the old school way. ■

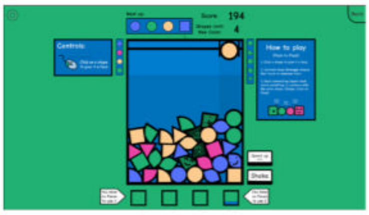
VERDICT

★★★½☆

SI's gap year was well spent on a fantastic match engine update, but progress is still too slow between games.

PHIL IWANIUK





PRICE Free
PLATFORM Browser
WEB samgames.itch.io

FACE TO FACE

Tetris but with snogging.

Face to Face gradually drops coloured shapes onto the game board. They don't automatically disappear, when making lines of the same colour or shape, but rather nestle into each other, waiting for your input. It's your job to click on a shape and then to link it to another similar playing piece. If the two shapes are touching, they will both disappear from the board.

The real goal is to link chains of shapes together. As long as each link in the chain is touching another of the same colour or shape, you can make great long links of circles or quarter-circles or rectangles, as they are then obliterated from the board.

I enjoy how the shapes move with physics, tumbling over themselves and into gaps, but it's a baggier puzzle game than the likes of *Tetris* and *Columns*. Whether innately or through practice or cultural osmosis, your brain can make sense of a *Tetris* grid remarkably quickly. However, the jumbled, jostling boards of *Face to Face* require a bit more untangling. ■

VERDICT

★★★½☆

You'll be doing a bit of dumbly staring before you can finally get to work.

TOM SYKES

TECH REPORT

The chips are down

The lasting legacy of the lockdown PC hardware boom.

It all feels like an odd dream now. Stepping out onto our doorsteps to bang on our pans every Tuesday evening. Nationwide shortages of baking ingredients. Terrible, self-administered haircuts and vast lines outside supermarkets, shoppers spaced two metres apart and wearing face coverings that you'd previously only seen in news reports about SARS in Asia.

However surreal the events of 2020 might seem now, five years later, the COVID-19 pandemic's effects were very real. As nations imposed their own lockdown rules of varying stringency, supply chains broke down and waiting lists lengthened exponentially. Zoom in on the PC hardware market, and PCB shortage completely disrupted the market. Lockdown restrictions in China, Taiwan and Korea, where the vast majority of circuit boards are manufactured, left the entire sector without its most crucial component. Worse, there was stiff competition for PCBs from every other sector. Car production stalled. Medical equipment was being made at a slower rate, at a time when we needed it the most.

The very limited numbers of PCB-equipped hardware units that were being made were further disrupted by an unprecedented logistical breakdown, brought about by border closures and export regulations. And not that this cake needed any icing on it, but the surge in demand for all kinds of electronic goods, stimulated by a housebound general population looking to soothe its boredom, provided a final ingredient to the supply chain mess.

FALLOUT 2020

Five years on, the global community has jettisoned the 'new normal' and gone back to the old one. Face masks, while more frequent than they were pre-2020, are a rare sight and mercifully we've all stopped trying to give ourselves a comedy mullet with a set of dog clippers and a hand mirror, and relinquished control back to the professionals. But the PCB shortage isn't over, nor are the effects of supply chain disruption or a surge in demand in the PC hardware market.

Let's start with pricing. Everything from case fans to GPUs is fantastically, punitively expensive now, orders of magnitude steeper than pre-COVID prices. The reasons are numerous, but basic supply and demand plays its role here. In 2022 US Commerce Secretary Gina Raimondo stated she expected that PCB supply chain disruption would continue "possibly into early 2024, before we see any real relief". More recently PCB manufacturer Garner Osborne has stated that like its contemporaries, it's still playing catch-up in the wake of that supply chain breakdown five years ago and the perfect storm of increased demand that accompanied it. If you as much as poked your head into a

Green-eyed monster

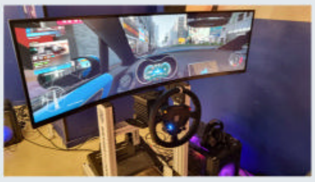
Uncertainty around financial markets sent Bitcoin prices soaring during COVID, which in turn renewed interest and demand for cryptomining. With miners buying up huge swathes of Nvidia's limited GPU stock, the used card market became predatory and units were changing hands for four or five times their MSRP. Arguably that normalised a higher price point for enthusiast GPUs, so that by the time Nvidia came to launch its RTX 3x, 4x and 5x series cards, it could sell them at a higher price than ever before.

Getty

FAR LEFT: Nobody who did this during lockdown was even remotely pleased with the results.

LEFT: Takes you right back to that very long, very indoors summer, doesn't it?

THE NEW NORMAL *Four PC gaming staples you didn't see before lockdown.*



DIRECT DRIVE WHEELS

Now available in affordable sub-$1,000 bundles, a notion that was pure fantasy in 2020.

ARTISANAL PERIPHERALS

Buying these is less about what they can do, and more about how limited and exclusive they are.

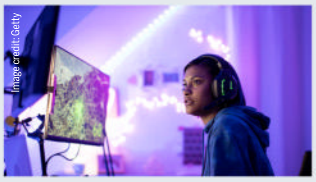


Image credit: Getty

STREAMER-GRADE SETUPS

RGB lightstrips and vibrant neon signs aren't just for making let's play videos any more.

STANDING DESKS

We all read the articles. We all bought them. And now we're all stuck with them.

GCSE business studies classroom, you'll know what increased demand and scarcity of supply does to pricing. COVID can't be blamed entirely for this, but it remains a contributing factor even now.

As for the surge in demand for PC hardware, market analysts including Market Watch were announcing the end of that phenomenon as early as Q1 2022, but they may have been a little early. Taking a longer view, the culture around PC gaming has changed since the lockdowns hit and a lot of those changes can't go back in the bottle.

Sim racing hardware manufacturers have finally – finally – caught up to the demand created by those 2020 lockdowns. All gamers wanted back then was an affordable direct drive wheel and pedals bundle to race online with in the kind of sims that they were watching real F1 driver compete in. But in 2020, Fanatec was pre-Corsair buyout and stocks were depleted very soon into the first wave of lockdowns. Logitech G fared better for availability, but didn't at the time have a direct drive wheelbase to offer. In fact not many manufacturers did. Moza, an upstart company from China, muscled in and became a permanent fixture on the sim racing scene by offering cheap but well designed and good quality direct drive hardware.

It's taken a full five years to see direct drive hit the mainstream though, with Logitech G, Thrustmaster and now even Turtle Beach and Nacon, entering the market with competitively priced bundles. The standard of wheels is immeasurably higher than it was five years ago, and it's hard to imagine that would have happened if people weren't so hungry for it in 2020 having watched Lando, Max, Charles et al streaming in their downtime.

Deeper than that though, it feels like we've evolved to value or gaming spaces in a different way. They've become true sanctuaries, adorned increasingly often in RGB lightstrips and finished with a gaming chair. Our hardware and peripherals aren't picked based purely on specs, but rather as an expression of our passion for the pastime. We pick artisanal gear over esports-grade models now, products with a story and, above all else, aesthetic appeal.

COVID CAN'T BE BLAMED ENTIRELY, BUT REMAINS A FACTOR

Reading that probably feels like reading 'water hydrates you' or 'weeks typically have seven days in them', so deeply has that thinking been absorbed. But even five years ago, many of us were simply making do, improvising PC gaming nooks wherever we could find space for an Ikea desk and access to a plug socket. COVID helped streamer culture break through into the mainstream, and streamer culture helped manufacturers to normalise a more curated gaming space.

What about actual PC sales? Perhaps that's the purest benchmark for how COVID changed the market. Was mass interest in PC gaming a flash in the pan, or have those recent lockdown converts stuck around? Well, it's muddy. 2020 and 2021's unit shipment sales are unlikely to be repeated, and they were followed by a huge dip in 2022, hitting a 20-year low. 2023 saw modest recovery, and after that point the buzz for AI combined with Windows 10's end of life has generated consistently higher sales year on year. One dreads to think what kind of global event might spark a surge in demand equivalent to 2020's, but if not numerically then culturally, lockdown left a mark on our corner of gaming. ■ ***Phil Iwaniuk***

TECH TALES

Money no object

We're becoming obsessed with artisanal gear. Let's talk about it.

If there's one phrase that's guaranteed to make you come across like a third-year humanities student who's got life figured out and now simply watches civilisation from the sidelines with a wry smile, it's this: 'late stage capitalism'. It's a term that implies society's imminent downfall at the hands of corporate greed. Whatever indicator of late stage capitalism the observer has noticed is also an indicator that these are the end times, before our economic and philosophical status quo is demolished and replaced by… well, whatever comes next. Nobody's sure about that minor detail.

Generally speaking, then, it's quite a blunt rhetorical device. Nobody can see the future, so there's some considerable confidence inherent in calling anything related to the present day 'late stage'. Still, when you see an $8,000 mechanical keyboard amassing a six-month waiting list, you can kind of see their point.

> IT LOOKS LIKE SOMETHING YOU'D USE ON THE USCSS NOSTROMO

Norbauer's Seneca doesn't offer wireless connectivity, or RGB backlighting. There's no adjustable key actuation point, or rapid trigger, or any of the other features that mass-market mechanical gaming keyboards use to catch your eye. However, it looks astounding. It looks like something you'd use to program a nice hot bath on the USCSS Nostromo. It could have come straight out of the recording studio where they tracked all your favourite songs from the '80s. The ones with the warmest, squishiest synths and the breathiest vocals.

And it can be purchased in its simplest form for $3,060, or with all the extras for $8,090. If that weren't preposterous enough, demand for this implausibly artisanal keyboard is so high that the waiting period is currently between six and nine months. If you were looking around for evidence that PC gaming has taken a cultural shift away from 'performance enhancing hardware' and into 'limited edition sneaker drops, but with PCBs', this is your definitive proof.

FOR KIT'S SAKE

But there's a supporting argument nearly everywhere else you look. Artisan mouse mats – quite literally, mouse mats made by a manufacturer called Artisan. Handcrafted, luxury wooden PC cases from Australian outfit Woodfort, yours for just shy of $2,800. Limited edition runs of Finalmouse models that sell for five times their MSRP. None of these items are even pretending to offer you better gaming performance, or increased functionality, for your cash. They simply exist to be sought after, and sought after they are.

From a gamer's perspective, it's understandable if the reaction this trend for expensive objets d'art is that of indifference. There's always a top end to any consumer market, one that's irrelevant to the majority but supported by enough financial whales to sustain a few very specialised companies.

THE NEW BETTER

But from a brand strategist's perspective, this consumer insight is far more meaningful. Imagine it: you're in the marketing team for a major PC hardware or peripherals brand, and you're observing that people are willing to pay huge sums of money for items that don't make them play better, but exist simply as status symbols, or expressions of their passion. What would you do?

That's right. You'd do what Corsair did, when it brought the Makr 75 barebones DIY keyboard to market. The selling point of a product like that isn't performance, which is otherwise the central pillar of

Phil Iwaniuk

Long-time contributor Phil has frequently tried to interest us in his 'artisanal' line of PC-inspired fragrances. His 'Deliveroo-infused MMO keyboard' cologne has some particularly interesting notes.

DO YOU DO FINANCE? *Four preposterously priced artisanal peripherals*

NORBAUER SENECA

Prices range from 'cheap second hand car' ($3,000) to 'expensive second hand car' ($8,000) for this, er, keyboard.

WOODFORT GENESIS

A $2,800 handcrafted wooden PC case for extra… cooling? No. Ventilation? Nope. Cool points? That's the bingo.

ARTISAN 零
NINJA FX / Made in JAPAN

ARTISAN FX NINJA ZERO

Compared to its contemporaries, $109 for a mouse mat seems like a bargain. Until you look at how much other mouse mats cost.

FINALMOUSE STARLIGHT

Releasing their mice in limited drops like rare sneakers is a clever marketing move. Use it to click on stuff.

LEFT: Seneca's keyboards are objets d'arte. Translation: really expensive.

Corsair's peripheral range. Instead it's about dialling a look, feel and set of features according to your own aesthetic tastes and needs. And that's a very sticky idea for marketers. Or what Razer did with the latest Blackshark Pro V3, a headset packed with far more features than anyone needs and which arrived to a warm reception from critics and consumers alike.

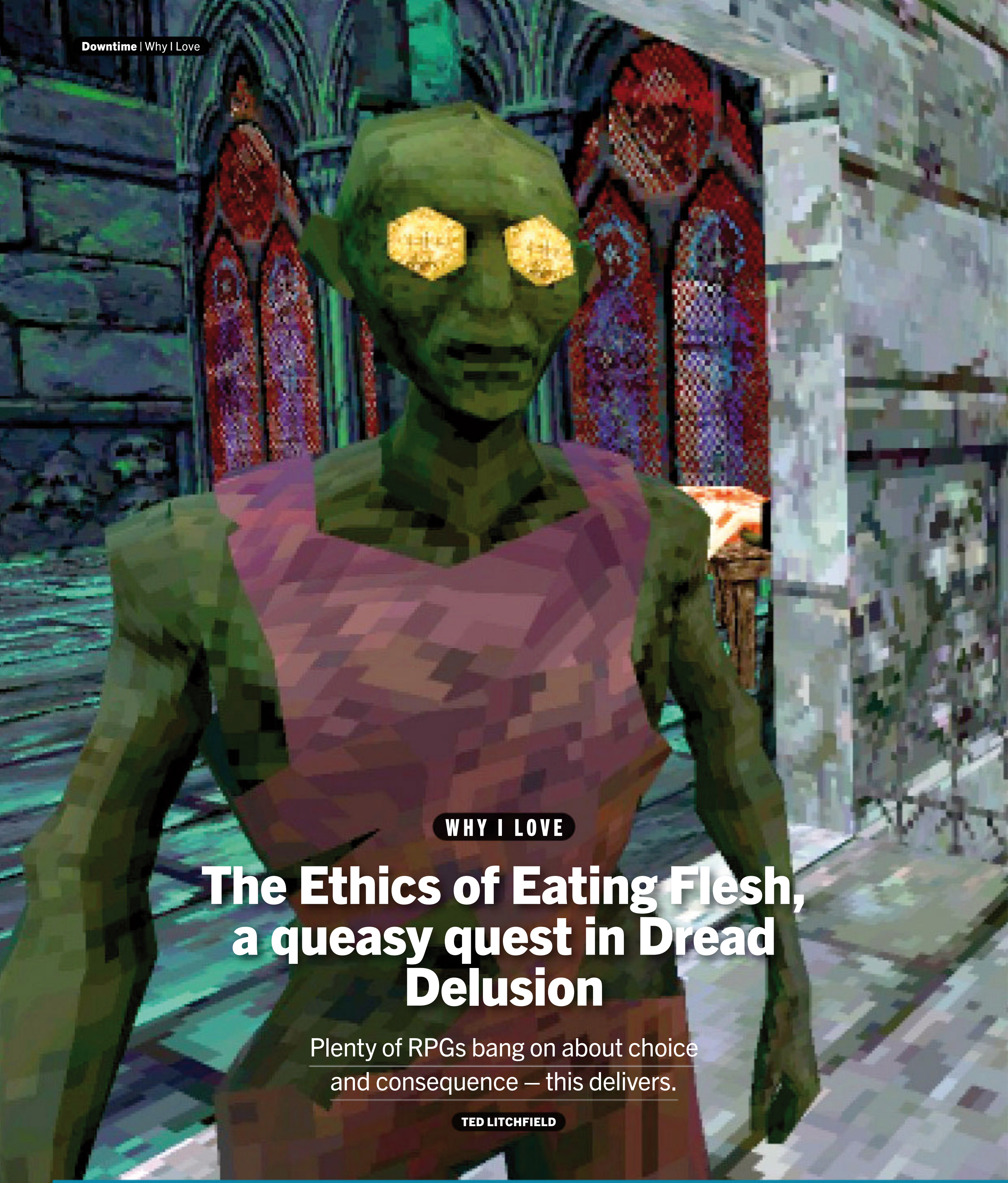
Perhaps it also represents a maturation of the platform. The earliest PC gaming equipment existed to discern itself from the default: an assembly of beige office furniture optimised for filling in spreadsheets about quarterly sales, not for circle-strafing, or fragging n00bs. It's why gaming mice, keyboards, cases and the like all went black during the '00s. It was a striking difference compared to the computer your dad sat at all day in his boring old office.

In the interim, the market's become so saturated that peripherals within a manufacturer's lineup might sit apart in $20, or even $10, increments. We've all digested the 'better gear = better performance' messaging for so long that, well, maybe it just stopped landing with us.

Whereas a $2,800+ handcrafted PC case made of wood? That's a new story. A fresh expression of our passion for hardware, and deep knowledge of it. The trouble is, mainstream hardware prices have already been driven up so high by various depressing market factors that in order to stand out as a truly artisanal, luxury product, companies like Norbauer end up slapping an $8,000 price tag on an unlit wired mechanical keyboard. ■

ABOVE: This wood riser costs an additional $290. This is not a misprint.

Over the decades, the important thing isn't what a piece of tech does – it's simply having it.

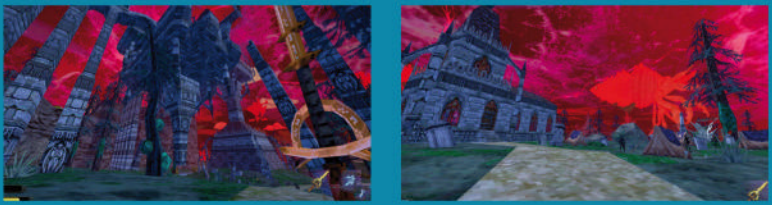


WHY I LOVE

The Ethics of Eating Flesh, a queasy quest in Dread Delusion

Plenty of RPGs bang on about choice and consequence – this delivers.

TED LITCHFIELD



LEFT: Prepping for a second Cadaver Crusade.

The indie RPG *Dread Delusion* is one of my favourite recent games, and I'd chalk that up to ambition. I'm not just talking about doing an *Elder Scrolls*-style open world with a small team, but how it grapples with capital-B capital-I Big Ideas. It's smart sci-fi with a sense of history. The quests feel like short stories from the '70s, Harlan Ellison or Philip K Dick stuff – there's always a twist, something to really make you think. One that's stuck with me is called The Ethics of Eating Flesh.

WHERE'S THE BEEF?

The Ethics of Eating Flesh takes place in the Endless Realms, whose inhabitants were turned into zombies in the past by one of those freaky deities. They're immortal, but still decay, and they have a maddening hunger for human flesh that resulted in Cadaver Crusades before one of their wizards invented the flesh farm: vat-grown human meat. Tubs of skin, teeth and eyes like enormous teratomas, an Impossible Burger ethical human meat alternative.

There's one flesh farm you can visit in *Dread Delusion*, with the rest said to be underground. You can speak to their inventor, Penitent Thaw, but there's nothing to indicate a critical quest here, with only the curiosity of observing the product up close to serve as a hook.

"You are like me," it announces telepathically once you're close enough. "A living thing. Unlike the dried up husks who cannot hear me no matter how bitterly I scream. I am The Way of All Flesh. I have a simple question for you. What is the meaning of life?"

This biomass became self-aware 100 years ago, and has understandable desires like "stop eating me", but it can only communicate with living things, not the Endless, and you're the first "breather" to pay a visit. This presents a dilemma.

Thaw would like you to destroy the farm, eliminating evidence and preserving the status quo. The Way of All Flesh does not want to die, beseeching you, "Please, I did not choose to be a thinking being. It was not a choice I made. It is just what I am." Sparing it will deprive the Endless of food once the story spreads, empowering a conservative element that wants to reignite the Cadaver Crusades.

ETHICS CLASS

The surprise start of this quest and the fact that it can be missed already really gets me: one of my favourite things in RPGs is the unexpected rabbit hole, the major quest in disguise. Sanguine's The Hangover sendup in *Skyrim*, A Night to Remember, which begins in a bar, is a classic example.

But The Ethics of Eating Flesh sticks with me by presenting a genuinely vexing choice, something RPGs often promise, rarely deliver, and that *Dread Delusion* has in spades. Eliminating The Way of All Flesh is politically convenient, preserving human life from the predations of the Endless, and sparing the zombies from an inevitable reprisal.

But what right do we have to snuff out a unique lifeform which has known nothing but pain and isolation? Further, Thaw can offer no assurance that this won't happen again – if it isn't already happening at all of the other farms.

Also, and not to get too woo-woo, I think this quest is an excellent example of sci-fi exploring a real social issue in a deferred manner. It's not polemical, and presents a fully contained story invested in its own fictional world, but when I replayed it for this article, I couldn't help but think about factory farming and the real-life ethics of eating flesh.

The Endless are able to justify their consumption because they are incapable of hearing the telepathic cries of the farm, but that doesn't change the fact that they are torturing a thinking, feeling thing. What similar nuances of thought or emotion are we incapable of recognising in farmed animals? This quest didn't make me a vegetarian, but it didn't hurt. ■

MORAL DILEMMAS

Some of Dread Delusion's other killer quests

A CASTLE, CURSED
Is easing one man's suffering worth risking a plague?

BELOW THE ENDLESS
A god offers an alternative to immortality.

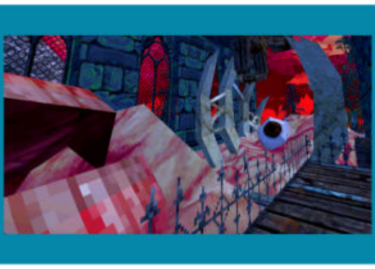
MADNESS OF THE KING
We built a computer god, but he's bluescreening.

MISSING PERSONS
A secret government project to erase and clone citizens.

THE GOD HUNT
A reawoken god of endless fecundity offers an end to famine.

THE GOLDEN TYPHOS
Just a good ol' fashioned ghost story in a flying ship.

> **"Tubs of skin, teeth and eyes like enormous teratomas, an Impossible Burger ethical human meat alternative."**



LEFT: I call it "Looooooooooong Pork". It's delicious.

GAME CHANGER

RELEASE 2006 **DEVELOPER** Human Head Studios **PUBLISHER** 2K Games **WEB** tinyurl.com/APC553prey

Prey

One of the most creatively ambitious FPS games of all time.

Robert Jones

Prey is a ridiculous game. Ridiculous in many ways, but mostly in terms of creative ambition. At its core, *Prey* is still an FPS, so you run forwards and sideways and, occasionally, backwards, while shooting stuff in the head. The shooting is good but not great. But surrounding that solid core is a game that drips with a level of ambition and creativity that few first-person shooter games have ever delivered, or even attempted to deliver. And it starts with the game's narrative setup, which immediately tells you that you're not in FPS Kansas any more.

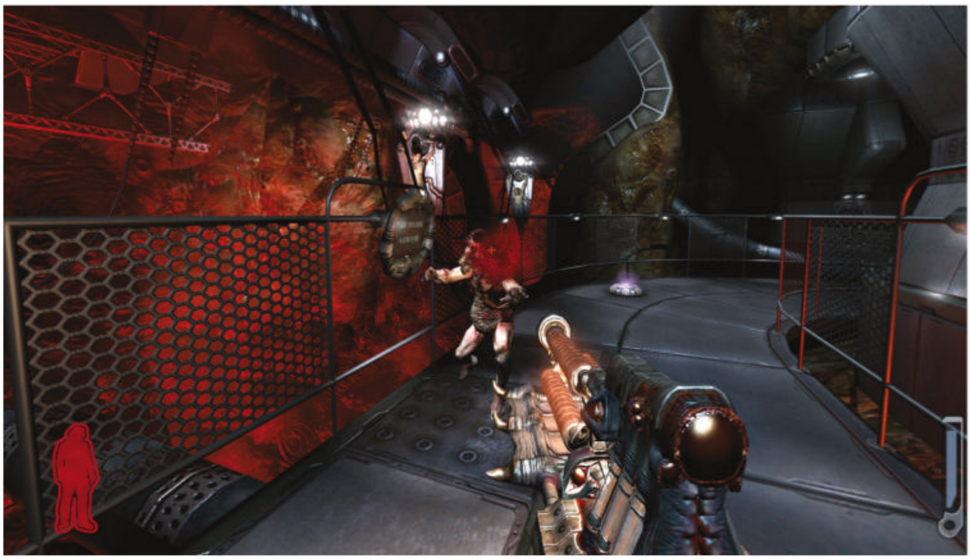
You're Domasi 'Tommy' Tawodi, a former soldier with Cherokee Native American blood running through your veins, and all you want to do is get off this god-damned reservation with your girlfriend, Jen, and start a new life away from your cultural heritage. Jen doesn't want to leave, though, and your grandfather, Enisi, who is the most Cherokee Native American of all time, is constantly bugging you to embrace your heritage and stay put.

As Jen is explaining to you why she doesn't want to leave, though, serving drinks at the reservation's bar, she's hit on by a pair of drunk thugs, and the next thing you know, you're beating them to a pulp while Jen desperately pleads with you to stop. That's when the roof of the bar is dematerialised and aliens in a giant spaceship tractor-beam you all up.

BEAM ME UP, TOMMY

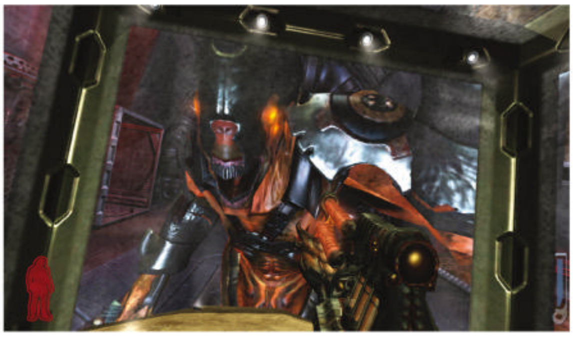
"Ah," you tell yourself, "that was pretty cool. Now to grab a gun and shoot aliens in corridors until you rescue Enisi and Jen." But *Prey* has other, wilder ideas, starting with the bloody and brutal murder of Enisi, who, while constrained with hand and ankle cuffs, has his organs forcibly removed and his body mulched. Woah! Jen, also, is whisked off into the bowls of the spaceship, screaming for you to help her. There will be no quip-tastic fast action movie rescue here.

And, indeed, if it wasn't for a mysterious character helping you yourself to get free from alien processing, then that would very much be that.



ABOVE: The alien space ship is dauntingly huge, making you feel small and insignificant.

RIGHT: Tommy is shrunk to miniature size and pursued by angry aliens. Cue Yakety Sax.



Freedom comes, though. And when I say freedom, I mean freedom to crash rapidly into *Prey*'s increasingly bonkers gameplay mechanics, one after another, at breakneck speed. Before you know it, you're flying through portals and solving puzzles that require the manipulation of portals. Think Valve's *Portal* gameplay, but streamlined.

The portals don't just appear as oval tears in reality that are floating in mid-air, though, but they are also found in movable doorways and even boxes. It's remarkable to see in an FPS of this era, and especially because *Prey* launched the year before *Portal*. Just when you get used to Tommy portaling hither and thither, though, *Prey* then throws its next cuckoo bananas mechanic at you – zero-G walkways. Power up these walkways in the alien ship, and before you know it, you're walking on walls and ceilings, looking down at the floor, which, just seconds before, you were standing on. Walkways snake around the ship, too, and just as you're trying not to barf up your lunch due to the disorientation, portals then open on the walkways, and you're suddenly fighting fugly aliens upside down on the ceiling.

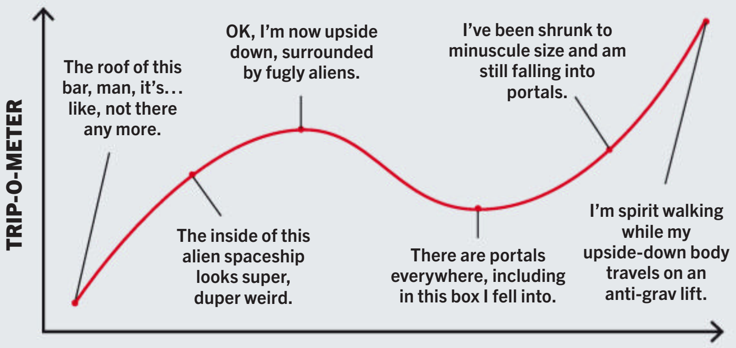
SHRINKFLATION

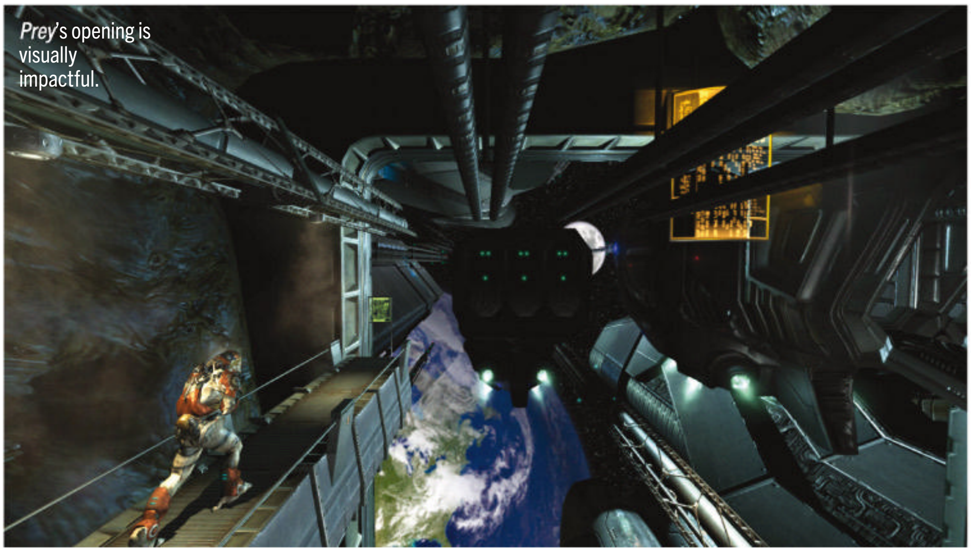
"This is all fine," you say to yourself, as you gun down aliens and dodge what look like genetically modified and augmented humans. How more trippy can *Prey* get? Hint: it gets a lot more trippy. As you're pushing around fleshy, organic egg-like sacks that are spewed forth from the alien ship, using them to blow open doors, as well as ducking under orifice-like vents that spew poisonous alien matter all over the place, you suddenly fall into a portal that transports you inside a small see-through box in the middle of a room, with you emerging, shrunk to miniature size, within the box. The box is filled with a small circular planetoid rock, which is suspended in mid-air.

Naturally, it is at this point that more miniature portals open on the planetoid, and you're forced to run around the ball, which has its own gravitational field, while fighting off even more miniaturised aliens.

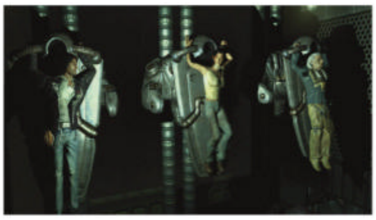
WTF-O-METER

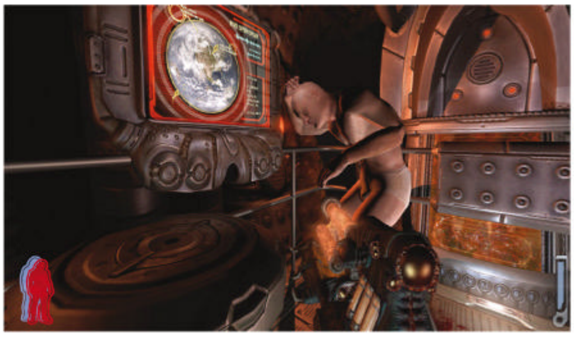
Prey's opening hour sure is a trip

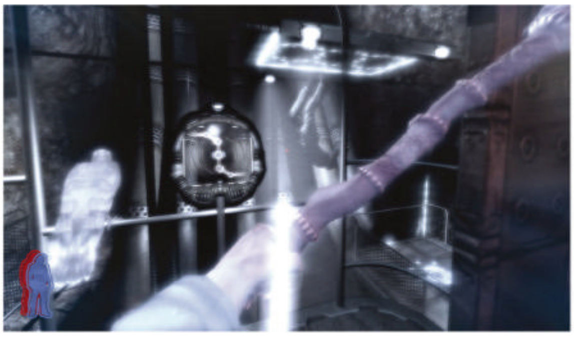


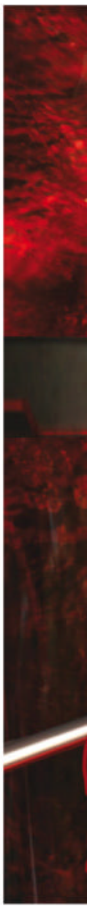


Prey's opening is visually impactful.









ABOVE: Tommy, Jen and Enisi after getting captured by aliens.

LEFT: Tommy spirit walking while his physical body is transported upside down on a moving lift.

So that's the end of the madness, right? Wrong! After escaping back out of the box via another portal that returns you to regular size, Tommy finds himself in a fight to the death in the remains of the reservation's bar, which was beamed up by the aliens too. Tommy is victorious, but soon finds himself plummeting to his death as the elevator he is in is then shot to pieces by the aliens. But, as you would expect from a game as creatively ambitious as *Prey*, Tommy's plunge does not end with a game over, but instead the introduction of another loopy game mechanic – spirit walking.

Tommy awakes in the spirit world, and here is the deceased Enisi, in full-on spectral Obi-Wan Kenobi form, introducing the spirit walking mechanic. Due to his Native American heritage, Tommy can leave his physical body behind and spirit walk, with his spirit then capable of manipulating things in the physical world and even attacking foes with a spirit bow. After completing the simplest trial of all time to spirit walk through a wall of fire, Tommy's spirit is returned to his body aboard the alien spaceship and invited to make use of his newfound ability. Moments later, Tommy is spirit-walking through force fields to turn them off, and attacking aliens from the spirit world with his spirit bow.

It doesn't end there, though, as before long Tommy is positioning his body on a zero-G walkway's moving platform, before leaving his body in spirit form to actuate the platform's go button, to then watch his upside-down body trundle past on said platform, before then rejoining his body and proceeding to fight yet more aliens upside down, both with real alien guns and his own spirit bow. Quite frankly, it's a weird assault on the senses that, coming as it does all within the first few hours of playing the game, feels almost overwhelming.

And that's to say nothing of the bit where, during all this mechanical madness, you watch a demon spirit kill an abducted child, taking the child's form, and then watch the demon kill another abducted child by brutally impaling him, before then trying to kill you, too, with the spectral foe trying to murder you in spirit form. Honestly, you may need to go put the kettle on after playing the opening hours of *Prey*.

RAW SPIRIT

Prey is engaging, that's for sure. And I don't think that has ever really been in doubt. The same can be said for its technical production, which I feel really does stand the test of time. This is a good-looking game that, at the time, was a

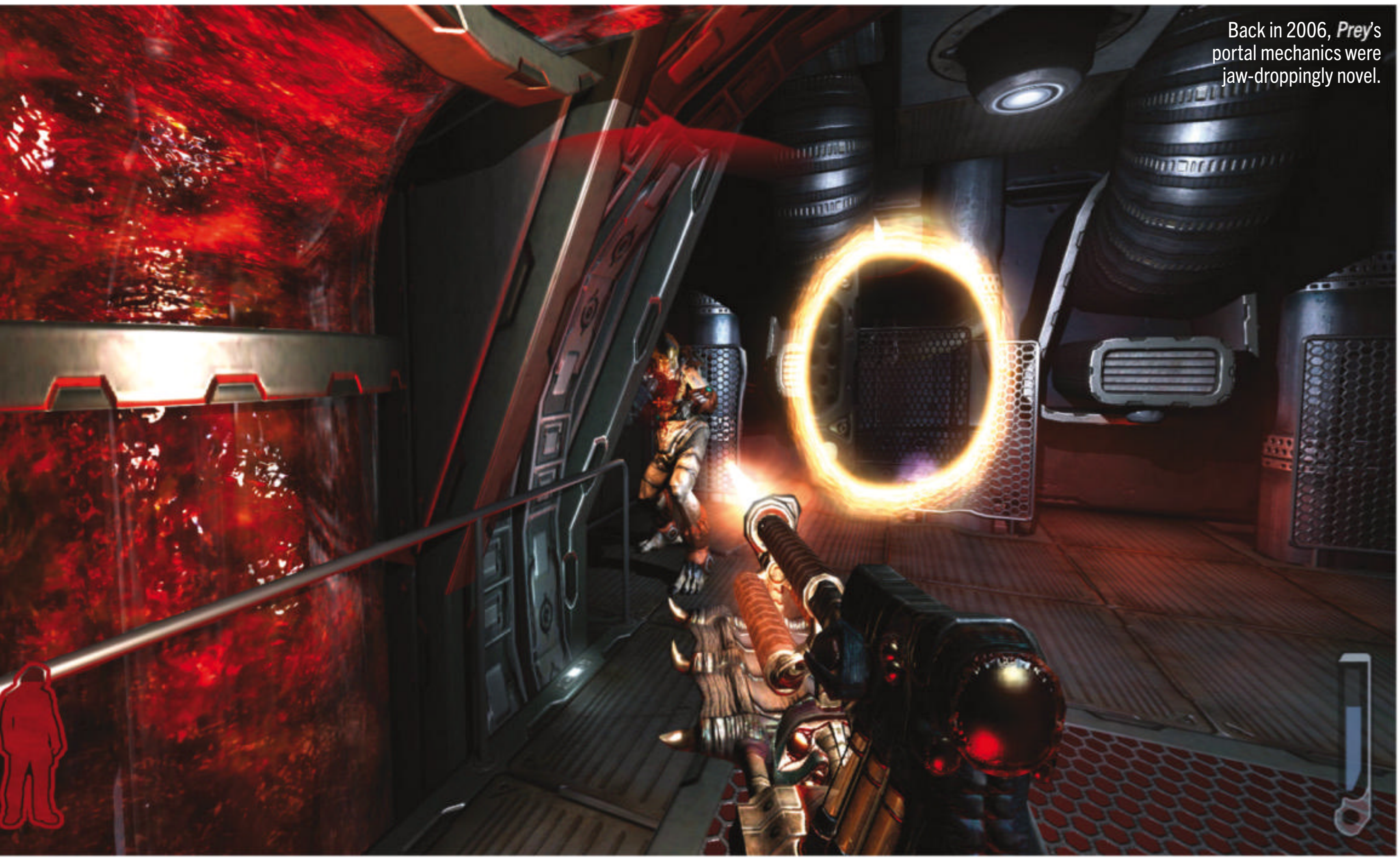
MEET DOMASI 'TOMMY' TAWODI

Prey's protagonist up close and personal

1 HERITAGE Tommy comes from a Cherokee Native American lineage, even though he rejects it.

2 BACKGROUND Tommy is a former soldier, having fought for the US Army when younger.

3 DREAM Tommy wants to leave the reservation with his girlfriend, Jen, and start a new life.



Back in 2006, ***Prey***'s portal mechanics were jaw-droppingly novel.

technical marvel and today still shines thanks to its strong art direction and raft of visual party tricks. Get *Prey* running today, and its impact in these areas is obvious. Maybe more obvious than ever, actually, when you compare it to some of the other FPS games released in 2006, such as *Black*, *Red Steel* and *Medal of Honor: Heroes*, which feel far more genre typical.

As you progress through the game, while the oddness of the mechanics dull, the plot continues to freewheel, and I think it's fair to say that Jen's fate, as well as that of the alien ship and Tommy, is not what you would expect. None of it is particularly original, cribbing here and there from a lot of popular 1990s sci-fi (I got Picard-era *Star Trek* movies a lot from it), but this amalgamation combines to maintain *Prey*'s weirdly alluring grip. Just when you think you're about to be out, *Prey* ambushes you with something weird and you find yourself back in.

Although on replay, I'm not sure *Prey*'s wild ambition actually did it any favours, with its out-there and different plot, non-typical cast of characters, and suite of technically impressive but almost overwhelming gameplay mechanics, leaving it a little lost in terms of the history of the genre and in terms of gamers' collective consciousness. In many ways, *Prey* is a cinematic, trippy, mature treat. But it also feels raw and a bit rough around the edges, with no part of the experience excelling, and no standout hook lingering in the memory. As I mentioned previously, the shooting in *Prey* is just good, for example, not great (this is no id Software FPS), and the puzzles, when they come, tend to be simple and quite dull. *Prey* may have introduced many PC gamers to portal tech in games, sure, but the puzzles it crafts with them, or the gameplay that comes out of them, is nowhere near as refined and fun as what Valve did with them a year later.

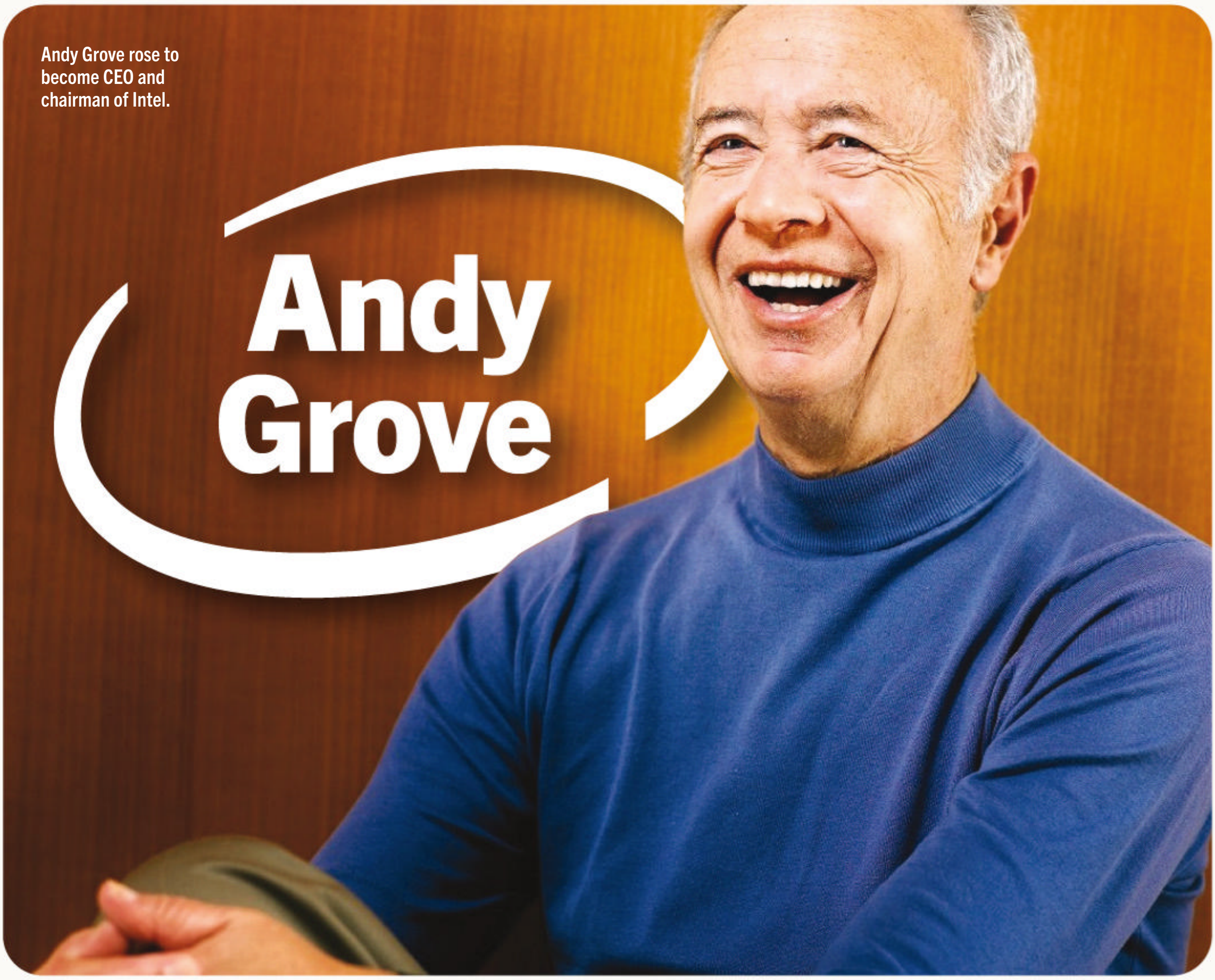
That said, though, in an era of modern FPS games today that, at least at the triple-A level, seem to steer increasingly away from single-player, cinematic, narrative-led, mechanically creative experiences, replaying a game like *Prey* feels fresh. There's still that element of creative, freewheeling, gaming industry Wild West lingering in *Prey*, I think, which was evident throughout the 1990s and early 2000s. It feels like a game from a different era of the gaming industry, where there were fewer restrictions, for both good and bad, on what you could do when developing a major game. Maybe this is a contributing factor to why *Prey* famously had a long and troubled development.

I'm still not sure that tells the whole story of *Prey*, though. *Prey* sold well on release, with over a million sales registered within the first few months, and a sequel was even initiated in 2009 and carried forward for many years as well. However, by that point, the rights for *Prey* had transferred to a new owner, Bethesda, via its parent company, ZeniMax Media, and the sequel was cancelled due to it reportedly not meeting the new owner's expectations. Bethesda then went and used the *Prey* name to launch a totally unconnected new game, Arkane's quite frankly superb 2017 game of the same name.

And, that was that. An unglamorous end to, maybe, the most creatively ambitious FPS game ever made. ■

RETRO

Inspirational stories from computing's long-distant past



Andy Grove rose to become CEO and chairman of Intel.

Intel Corporation

The man who transformed Intel

David Crookes profiles a man often overlooked when discussing history's most influential people in tech.

Molotov cocktails arced through the foggy October air as Red Army tanks made their way down the frozen streets of Budapest. It was October 1956, and the city pulsed with fury. Crowds roared and urged the Soviets to leave, only for their cries to be drowned out by the rattle of machine gun fire.

András Gróf was 20 years old and just starting his second year at the University of Budapest. His young life had been difficult. Mocked as a Jew at school before the Second World War, he'd been forced into hiding with his mother during the Nazi occupation from 1944, avoiding the brownshirts and living in a cellar with other families.

When the war was over, Hungary emerged from the destruction under the USSR's totalitarian sphere of influence, yet life continued to be tough for Gróf and his family. His father, arrested and tortured in a labour camp, had returned only to have his business taken away from him by the Soviet-backed Communist Party. Food and fuel were sparse.

While Gróf grew to enjoy some of the finer things life had to offer, in particular finding a love for literature and opera, problems were never far from the surface. So when the Hungarian Revolution began in 1956, Gróf knew he needed to escape. With his family's backing, he joined 180,000 other Hungarians heading for the border with Austria, while a further 20,000 sought refuge in Yugoslavia.

Crossing the Iron Curtain wasn't easy. There were landmines, watchtowers and spotlights that would flood the ground and pick out refugees desperately trying to avoid detection. To progress, Gróf, accompanied by his best friend, Jancsi, had to move forward with the utmost caution. They walked through a dozen villages and eventually reached an open field with faint lights in the distance. Aware that they were looking at Austria, the pair traipsed forward, their feet sticking in the mud. Then they began to hear dogs barking.

They fell to the ground, face down and held their breath. "Who is there?", a man said in Hungarian. They hesitantly picked themselves up and headed towards the voice. "Relax," the man said. "You're in Austria." Gróf smiled with relief. It was the start of a fresh life and the beginning of a new adventure. Gróf was about to embrace the American capitalist dream.

EARLY SUCCESS

After heading for New York City on board a rusty ship, Gróf lived in the Bronx with an uncle and studied chemical engineering at City College. Keen to fit into his adopted country, he also changed his name to Andrew S Grove.

Grove worked hard and graduated from college at the top of his class. He also met his future wife, Eva Kastan, herself a refugee. They married in 1958 and moved to the west coast of the US. Grove enrolled at the University of California, Berkeley, and graduated with a PhD in chemical engineering in 1963.

ABOVE Andy Grove, left, alongside Robert Noyce (centre) and Gordon Moore (right).

He initially worked as a researcher at Fairchild Semiconductor, rising to become the company's assistant director of development. Having become familiar with the early development of integrated circuits, he wrote the textbook Physics and Technology of Semiconductor Devices in 1967. The following year, Grove went to work for Intel, the company founded by Gordon Moore and Robert Noyce, joining on the day of its incorporation.

In truth, saying Grove "worked for" Intel is a blatant understatement. He was, in so many ways, the driver of Intel's success – the man who could be credited for the company becoming the world's largest semiconductor manufacturer for many, many years (a position it has since lost). Under his ever-watchful eye, Intel dictated the pace of the computer industry and had the firmest of grips on the market. Grove's approach to business also influenced the likes of Amazon's Jeff Bezos and Apple's Tim Cook.

Yet Grove's prominent role at Intel raised eyebrows – initially, at least. When Noyce and Moore were looking for a director of operations for their newly founded company – a role that involved ensuring products would be designed on time and within budget – no-one would ever have expected Grove to be in the running. He had never overseen a manufacturing process and his background was in physics and academia rather than business management.

But Noyce and Moore saw something compelling: an intelligent, organised man who

> **"In truth, saying Grove "worked for" Intel is a blatant understatement. He was, in so many ways, the driver of Intel's success – the man who could be credited for the company becoming the world's largest semiconductor manufacturer for many, many years."**

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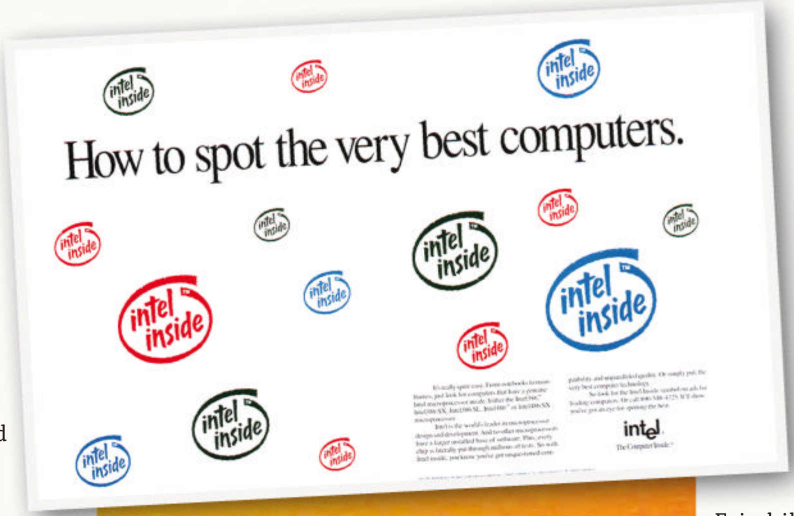
How to spot the very best computers.
intel inside
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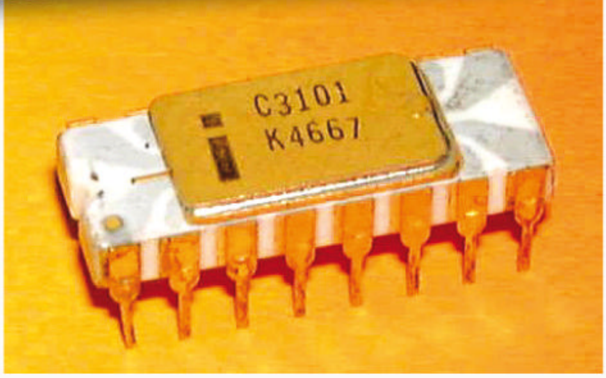
The Computer Inside.



TOP The Intel Inside campaign in 1991 was directly aimed at consumers.

ABOVE Intel's 3101 SRAM was its first product, released only a year after the firm began operations.

thought clearly, set objectives and went about his work in an almost Soviet-like manner with discipline, control and a focus on detail. He would prove himself to be a tough operator, unafraid to upset others if it was for the good of the company. There are many stories about the way he operated.

Some of them are detailed in Tim Jackson's excellent book, Inside Intel, which charted the rise of the chipmaker in the 20th century. He recounts the time when Ann Bowers, Intel's human resources manager, had to warn Grove's potential secretaries ahead of their interviews that he was an intense perfectionist who didn't mince his words and so wouldn't be easy to work with. Bowers wasn't wrong. Sue McFarland is reported to have discovered how tricky Grove could be after she was offered the job. She was pulled up by Grove for being ten minutes late for work three times in the first week.

But then Grove's penchant for time-keeping was legendary. He introduced a "Late List" in 1971 after becoming infuriated when he saw the car park filling up after 8am, the start time he'd designated for all Intel employees. It didn't matter if people were working well into the evening. Grove wanted everyone in the company at their desk on time in the morning and they had to sign their names upon entering the building if they were late. As you may expect, this led to much resentment.

INTEL'S IMPACT

Yet it didn't affect Intel – quite the reverse, in fact. The company was doing well, making great strides in the nascent semiconductor memory market. In 1969, it had produced 64-bit Intel 3101 static random-access memory, which was twice as fast as the SRAMs created by rivals. It showed that Intel, despite being only one year old, was capable of creating innovative products in a very short amount of time. A message that was cemented when Intel followed it up with the 1101 SRAM. The company rapidly expanded and created the 1103 dynamic random-access memory (DRAM) integrated circuit the following year.

In 1971, Intel launched a groundbreaking product: the Intel 4004 4-bit CPU, which was the first commercially available general-purpose microprocessor. A print advert in *Electronic News* said it was "a new era of integrated electronics" and so it proved. Intel became a publicly traded company in October 1971 and launched the world's first 8-bit programmable microprocessor, the Intel 8008, in 1972. Production wasn't always plain sailing and Grove clashed with employees at times, but there was no denying his significant influence over the company.

That's not to diminish the importance of Noyce and Moore. According to Grove, Moore in particular became a "father figure", and the pair spoke often and extensively about the company and its direction. Grove learned from Moore's calm, analytical style. He also learned to read Moore – one furrowed brow and Grove would instantly ask what was bothering him then listen intently to the answer. Moore once told Grove that "one day you'll run Intel", according to Time magazine. And that came true.

Throughout the 1970s, Intel continued to produce memory, including the EPROM (erasable programmable read-only memory, invented by Dov Frohman, who had moved to Intel from Fairchild) as well as processors such as the 8080 and the 16-bit 8086. Grove also continued to put his stamp on the company, whether that was through his cleanliness inspections (he believed a tidy desk equalled a tidy mind) or formulas such as McIntel. Grove wanted semiconductor fabrication plants to be as similar as possible, in the same way that McDonald's food is similar across the world.

Grove also steered Intel through a series of challenges, notably from Motorola and Zilog, and he became president of Intel in 1979. Around this time, Grove had implemented a system called Intel Management By Objectives (IMBOS). It was a goal-setting framework also known as Objectives and Key Results (OKRs) and it was documented in Grove's hugely influential book, High Output Management, in 1983. This would become widely read by the movers and shakers of Silicon Valley – Meta's Mark Zuckerberg is known to be a fan.

KEY DECISIONS

The book – effectively a crash course in middle-management – looked primarily at how companies can apply production principles to management. It focused on the efforts of teams and how to make them work at their best. Grove deconstructed the importance of one-hour, one-on-one meetings that set agendas and the benefits of performance reviews, while looking at the process and goals of interviews and compensation packages. It revealed just how much thought Grove put into heading up Intel.

Such clarity of mind was necessary because Intel's place in the industry continued to be challenged, not only internally through the poor reputation of the 80256 – Intel 286 – microprocessor launched in 1982, but by overseas companies such as NEC, Toshiba and Fujitsu in Japan, all of which were making inroads into the microprocessor and memory markets. The DRAM market was of great importance to Intel, accounting for 90% of its sales revenue, but its market share declined dramatically from 82.9% in 1975 to 1.3% four years later.

In 1985, Intel's annual report admitted it had suffered a "miserable year". A business slowdown in 1984 had worsened and there was lower than expected market growth. The company was also still reeling from a widespread brain drain, which had seen top talent leave to create their own firms (Zilog was set up by former Intel employees). What's more, the Intel iAPX 432 – its first 32-bit processor design – was a commercial failure, discontinued in 1986.

Grove knew Intel needed to adapt quickly, more so when 1986 proved to be an even tougher year. It wasn't easy. The company was forced to lay off 7,200 employees, close plants and pull out of the DRAM market. But Grove made some big decisions – decisions that would prove crucial. He ordered Intel to target the PC market and produce microprocessors designed for use in these computers. The company developed the 32-bit 80386, which became known as the Intel 386 and i386, with volume manufacturing starting in 1986.

Intel hoped IBM would use the chip, but the computer maker initially resisted because, concerned about the rising number of clones, it wanted to regain control of the PC market by introducing architecture of its own. To Intel's relief, however, Compaq Computer stepped forward and expressed a desire to produce a machine based around the Intel 386, and this led to other manufacturers wanting to do the same. As a result, Intel's dominance of the microprocessor market grew and Grove became CEO of Intel in 1987 – the year the company became profitable again.

A NEW ORDER

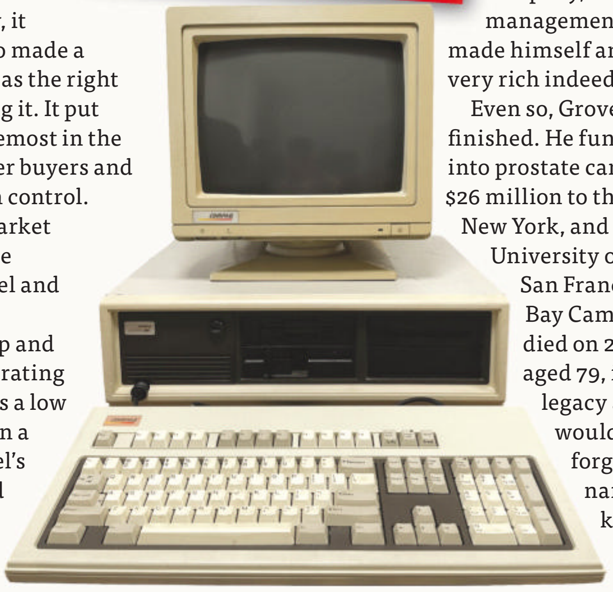
Under Grove's leadership, Intel also ceased second-sourcing its microprocessors, which meant only Intel could supply its architecture. In another winning move, Intel began to market directly to consumers rather than to manufacturers. This began in 1989 with the Red X campaign, which proved to be a stroke of genius by the marketing team. Adverts placed in magazines showed a sprayed-out 286 followed on the next page by the number 386 and the sprayed letters "SX". The suggestion was that 286 wasn't enough for computer users. It was telling consumers to look for a computer with a 386SX processor instead. The impact this had was huge.

For years, consumers buying a computer focused, to a great extent, on the manufacturer's badge on a computer's case. Now they were effectively being told to ignore that in favour of the type of chip inside. This message was taken to the next level with the Intel Inside campaign. Launched in 1991, it suggested people look out for a sticker on the machines saying "Intel Inside", which it pushed as a mark of quality. Suddenly, it mattered less who made a computer so long as the right chip was powering it. It put Intel first and foremost in the minds of computer buyers and put Intel firmly in control.

Soon, the PC market effectively became dominated by Intel and Microsoft: Intel providing the chip and Microsoft the operating system. There was a low point in 1994 when a problem with Intel's Pentium chips led to a full recall, costing Intel some $475 million, but Grove remained on top of his brief. Never one to rest on his laurels, he believed it was important to experiment and keep one step ahead of the competition, knowing that inertia would only lead to another company overtaking Intel. Grove's motto became "only the paranoid survive". He published a management book using those words as the title in 1996 and his lesson in leadership quickly spread.

MAN OF THE YEAR
TIME
INTEL'S ANDREW GROVE
HIS MICROCHIPS HAVE CHANGED THE WORLD—AND ITS ECONOMY

BELOW *Time* made Andy Grove its Man of the Year in 1997.



BOTTOM The Compaq Desktop 386 was the first computer to use Intel's 32-bit 80386 microprocessor.

By 1997, *Time* magazine was picking up on Intel's huge success. It said 90% of the 83 million computers sold that year had an Intel chip, and it was so impressed with Grove it made him its Man of the Year – "the person most responsible for the amazing growth in the power and innovative potential of microchips". It was a fitting personal high and a just reward for a leader who had transformed an industry. Grove became Intel's chairman that year.

Yet his time at Intel was winding down. Grove had been diagnosed with prostate cancer a few years before, so he passed the role of CEO to Craig Barrett in 1998, remaining chairman until 2004 then becoming a senior advisor. But his work was done. The Hungarian refugee had helped forge the world's most successful chip company, influenced management style and made himself and a lot of people very rich indeed.

Even so, Grove wasn't quite finished. He funded research into prostate cancer, donated $26 million to the City College of New York, and established the University of California, San Francisco's Mission Bay Campus. When he died on 21 March 2016, aged 79, it felt like his legacy and impact would never be forgotten. While his name isn't so well known today, his is a life worth celebrating. ■

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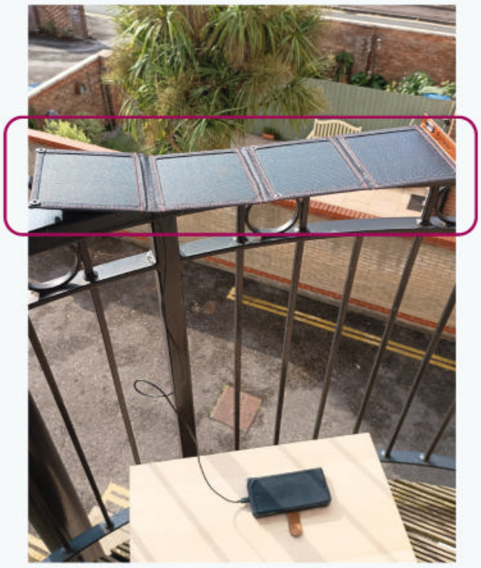
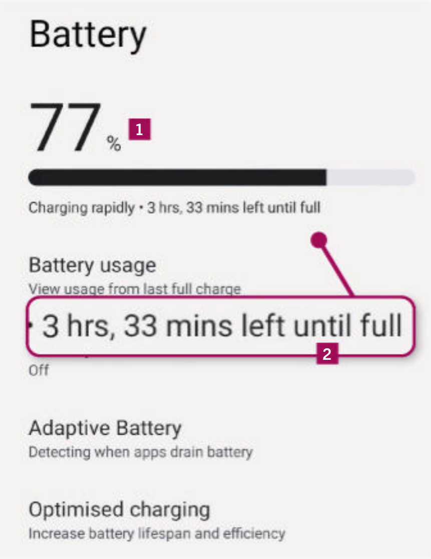
Worried his phone's battery will run out when he's away from home, **Robert Irvine** tries to…

Charge his phone using the sun

I suffer from a condition known as 'low-battery anxiety' – "a quirky side effect of our tech-reliant world" according to ChatGPT. When I'm out and about, I compulsively check the charge level on my phone, and fret that even having battery-saver mode enabled won't get me through the day.



Robert placed the solar charger on his balcony for maximum sun exposure.



Battery

77 % 1

Charging rapidly • 3 hrs, 33 mins left until full

Battery usage

View usage from last full charge

3 hrs, 33 mins left until full 2

Off

Adaptive Battery

Detecting when apps drain battery

Optimised charging

Increase battery lifespan and efficiency

After two hours the charge level increased from 57 to 77 percent.

> "After only an hour, its charge level had increased from 58 per cent to 67 per cent, and at two hours – despite a few clouds – it hit 77 per cent, with 3 hours and 33 minutes left until full."

It's a silly worry, really, because power outlets are everywhere these days – from mains sockets in coffee shops and pubs to USB charging points on buses and trains. Where you don't get them, however, is in a park, on a beach, on a country walk and in other places one might venture on a summer's day.

With the warm weather encouraging me to go out more than usual, my low-battery anxiety kicked in. What if my phone ran out of juice in the middle of nowhere, leaving me unable to call or WhatsApp anyone (assuming I could get a mobile signal)?

To address this dilemma, I decided to buy a portable solar charger for my phone. This would potentially provide me with power when no socket was within reach – as long as it was sunny enough.

As is my wont, I ordered the cheapest one I could find on Amazon, from an obscure brand called Norwill, for a mere $10. This came with a warning that I "shouldn't have high expectations", which was borne out by its failure to deliver even a smidgen of solar power.

Next, I tried a Blavor solar power bank (**tinyurl.com/APC553blavor**), which cost $49 and had a 4.7 rating on Amazon. This arrived fully charged, so I ran down the power and placed it on my sunlit balcony to replenish its juice (it can also be charged from the mains, but that would be cheating).

Sadly, the replenishment never happened, and after a full day of moving it around in line with the sun, it hadn't recharged at all. This was disappointing, because I liked its built-in torch and compass. Back to Amazon it went for a full refund.

I then realised I should probably do some research into solar chargers before wasting money on another defective device. I discovered a brand called BigBlue (**bigblue-tech.com**), which regularly rates highly in independent comparisons, and is regarded as a market leader in portable solar-powered technology.

I bought a 28W BigBlue charger from Amazon for $119 (**tinyurl.com/APC553bigblue**). It came with a USB cable, two clips for attaching it to a rucksack and very simple instructions.

The charger itself is like a large wallet (measuring 6.1x15.2x5.4 cm), with four fold-out solar panels and a USB adapter. I connected my phone and placed the BigBlue on my balcony to catch the morning sun. Initially, I stuck it on the rail (pictured above) before moving it to a safer position on a small table.

Unlike the other chargers, my phone instantly detected a power source and showed the charging symbol, along with a 'Charging rapidly' message. After only an hour, its charge level had increased from 58 per cent to 67 per cent, and at two hours – despite a few clouds – it hit 77 per cent (1 in screenshot), with three hours and 33 minutes left until it would reach full charge 2.

This was very impressive, especially compared with the previous two duds, and within five hours my phone was fully charged – faster than predicted.

The BigBlue is lightweight, waterproof and easy to slip into your jacket or bag when folded – or attach to it using the supplied buckles. It is a genuinely useful product, and not the gimmick-tech I expected. It's certainly reduced my low-battery anxiety, and though it obviously works best in direct sunlight, I won't be venturing far when the weather's foggy and grey. ■

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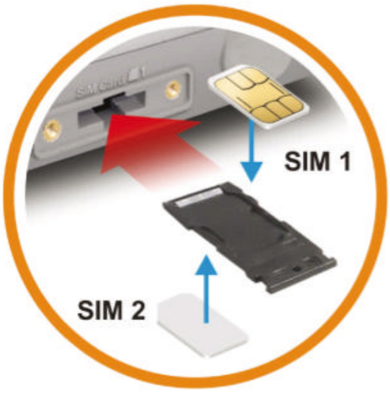
- NAT throughput 940 Mbps
- IPsec VPN throughput up to 370 Mbps (AES 256 bits)
- 802.11ax (WiFi 6, AX3000) Wi-Fi up to 574 + 2402 Mbps link speeds (ax model)
- 16 x VPN tunnels, including IPsec, OpenVPN, and WireGuard, with EasyVPN features that simplify VPN setup for effortless connectivity
- Object-based SPI Firewall, Content Security Management (CSM) and IP Reputation
- IAM (Identity and Access Management) to enhance security management and user experience
- IPv6 & IPv4
- Virtual AP Controller for the deployment of up to 20 wireless VigorAPs
- Wireless Mesh (ax model) up to 7 VigorAPs
- Virtual Switch Controller to manage up to 5 VigorSwitches
- Supports VigorACS 3 Central Management Software for remote management
- 2 years back-to-base warranty



** Typical 5G Downlink/Uplink speeds are 400Mbps/200Mbps, depending on the local conditions.

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